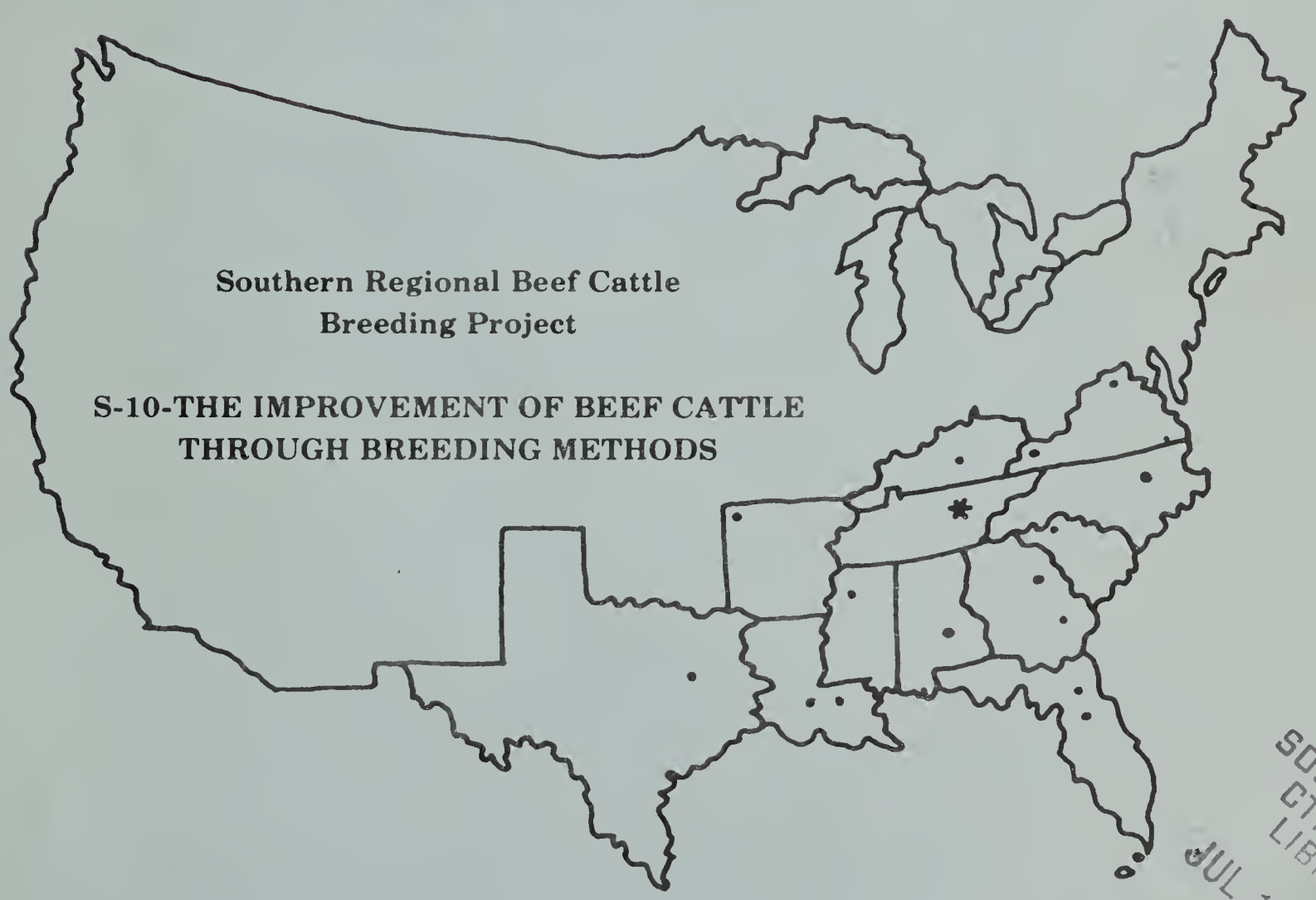
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH
SOUTHERN REGION
and
COOPERATING SOUTHERN STATES

1979 Annual Report of S-10 and Report of Annual Technical Committee Meeting University of Kentucky Lexington, Kentucky June 6-8, 1979



This report is intended for the use of administrative leaders and workers and is not for general publication.

TABLE OF CONTENTS

I N T R O D U C T I O N

This project was initiated in 1948 to investigate and develop methods of breeding more productive beef cattle for the South. Detailed annual reports showing research developments and progress in each state have been prepared each year since 1950. Complete results of certain phases of the project have been reported in regional bulletins and technical articles to the S-10 project.

This publication includes the proceedings of the 1979 annual meeting of the S-10 Technical Committee and the annual reports of projects in each of the eleven contributing states. The annual reports of S-10 contributing and supporting projects were prepared by the project leaders and other personnel at the various stations during 1979. The results are not considered final, but the materials aid cooperators in developing an integrated program. This report also provides information needed by heads of animal science departments, experiment station directors and U.S. Department of Agriculture officials for evaluation of the projects with respect to objectives and procedures. This report is not for general distribution and material contained in it should not be quoted in publication.

***

MINUTES OF S-10 EXECUTIVE COMMITTEE
New Orleans, Louisiana
February 6, 1979

The S-10 Executive Committee plus many of the other Technical Committee members met for the annual mid-year business session in Room 1468 of the Grand Hotel, New Orleans, Louisiana, at 5:10 p.m. on February 6, 1979. This session was held during the 1979 Meeting of the Southern Association of Agricultural Scientists. The following Technical Committeemen or their representatives were present :

Arkansas - C.J. Brown, University of Arkansas, Fayetteville

Florida - Marvin Koger, representing University of Florida, Gainesville

Kentucky - Fred A. Thrift, University of Kentucky, Lexington

Louisiana - Donald E. Franke, Louisiana State University, Baton Rouge

South Carolina - Carl E. Thompson, Clemson University, Clemson

Tennessee - Robert R. Shrode, University of Tennessee, Knoxville

Texas - Charles R. Long, Texas A & M University, College Station

Virgin Islands - Harold D. Hupp, C.V.I. Agricultural Experiment Station, St. Croix

Administrative Advisor - Doyle Chambers, Louisiana State University, Baton Rouge

Investigations Leader - Will T. Butts, ARS-USDA, University of Tennessee

Also in attendance:

James R. Hill, Clemson University, Clemson, South Carolina

Chairman Carl Thompson opened the meeting at 5:10 p.m. by asking that the minutes of the Annual Meeting be approved. Fred Thrift so moved and Donald Franke seconded the motion. Motion was passed.

A discussion followed on the preparation of the two Regional Publications, "Breed Characterization" and "Crossbreeding Effects". C.J. Brown reported the progress on Breed Characterization. By the date of the Annual Meeting this should be in draft form for input by the Committee.

Donald Franke reported that the Crossbreeding data was at a standstill. Because of missing purebred Angus and Hereford controls at some stations, the data is very messy. He also reported having been in contact with NCI for help on how to handle the data. Dr. Nelson and Dr. Cundiff have suggested using a base and ratios for handling the data. By Annual Meeting time this report will be more complete.

Fred Thrift announced that the 1979 S-10 Technical Committee Meeting will be held on June 6-8 in Lexington, Kentucky. Motel lists, etc. will be mailed later to each Committee member to make his own personal arrangements. The following agenda has been planned: Wednesday morning will be for Station Reports and Regional Publications discussion. The afternoon will be spent touring the three University of Kentucky farm facilities at Lexington. In addition, one horse and one beef farm will also be visited. A banquet is scheduled for that evening. Thursday morning, E.L. Lasley, of Farmers Hybrid Company, Inc., and K.E. Gregory, of Clay Center, will be the featured speakers discussing Synthetic breeds. Thursday afternoon will be spent touring horse farms and a Limousin farm in the Winchester area. The business meeting is scheduled for Friday morning, 8:00 - 10:00 A.M. A Horse Park tour is scheduled from 10:00 to noon. Fred Thrift will coordinate travel to and from the airport if advance notice of arrival is given.

Will Butts announced that his plans to visit the S-10 projects were drastically curtailed due to low travel allotments this year.

Doyle Chambers explained the structuring of the Science and Education Administration (SEA) and fund relocations. He has reviewed the regional Beef

Forage Project and believes that the S-10 could administer it since both have the same objectives. Doyle said he would try to get a copy of the proposal circulated to the Committee members for their review.

AGENDA
S-10 Technical Committee Meeting
Lexington, Kentucky
June 6-8, 1979

JUNE 5	Arrive Hilton Inn, 1-75 at Newton Pike, 1938 Staton Way, Lexington, KY 40505 (606) 259-1311
JUNE 6	
8:00-8:15 a.m.	WELCOME; Hilton Inn, Keeneland Hall Room C.O. Little, Associate Director Kentucky Agricultural Experiment Station; V.W. Hays, Chairman Animal Sciences Department
8:15-9:45 a.m.	STATION REPORTS
8:15-8:30	Alabama - T.B. Patterson
8:30-8:45	Arkansas - C.J. Brown
8:45-9:00	Florida - J.R. Crockett
9:00-9:15	Kentucky - F.A. Thrift
9:30-9:45	Louisiana - D.E. Franke
10:00-9:00 p.m.	TOUR
10:00-	Depart for Spendthrift Farm, Iron Works Pike
10:30-11:30	Spendthrift Farm, Thoroughbred Horses; John Williams, Manager
11:30-	Depart for lunch
11:45-12:45	Lunch
1:00-	Depart for Castleton Farm, Iron Works Pike
1:30-2:30	Castleton Farm, Standardbred Horses; Carter Duer, Manager
2:30-	Depart for University of Kentucky Research Farms
3:00-4:30	Overview of research underway on Coldstream, Main Chance and Spindletop Farms
4:30-	Depart for Mint Springs Farm, Versailles, KY
5:00-6:30	Mint Springs Farm, Simmental and Senapol Cattle; Don Applegate, D.V.M., Manager

6:30-9:00	Cookout, Mint Springs Farm
9:00-	Depart for Hilton Inn

JUNE 7

8:00-11:00 a.m.	NEW BREED DEVELOPMENT; Hilton Inn, Red Mile A & B Room
8:00-9:00	Utilization of Genetic Diversity to Improve Efficiency of Beef Production, Keith Gregory, USMARC
9:00-9:15	Break
9:15-10:15	Review of Farmers Hybrid Cattle Breeding Program, Earl Lasley, Farmers Hybrid
10:15-10:45	Discussion
10:45-10:00 p.m.	TOUR
10:45-	Depart for lunch
11:00-12:00	Lunch
12:00-	Depart for Claiborne Farm, Winchester Pike, Paris, KY; we will drive through Greentree Stud Farm, Paris Pike, on our way to Claiborne Farm
1:00-2:00	Claiborne Farm, Thoroughbred Horses, John Sosby, Manager
2:00-	Depart for Arcadia Farms, Paris, KY
2:30-4:00	Arcadia Farms, Commercial Cattle; Tom Caudill, Manager
4:00-	Depart for Hilton Inn
5:00-6:30	Dinner, on your own
6:45-	Depart Hilton Inn for Red Mile Harness Track, 847 South Broadway, Lexington, KY
7:30-	First race, Red Mile Harness Track

JUNE 8

6:30-8:00 a.m.	TOUR
6:30-	Depart Hilton Inn for Modern Cattle Management, Inc., Parkers Mill Road, Lexington, KY
7:00-8:15	Modern Cattle Management, Inc., Simmental Cattle; Roy Gray, Jr., Owner
8:15-	Depart for Hilton Inn

8:30-12:00	HILTON INN, Red Mile A & B Room
8:30-9:30	Further discussion of items pertaining to station reports and new breed development
9:30-9:45	Break
9:45-12:00	Business Meeting Administrative Advisor Investigations Leader CSRS Representative
12:00-	ADJOURN

MINUTES OF S-10 TECHNICAL COMMITTEE MEETING
Lexington, Kentucky
June 6-8, 1979

The meeting was called to order by Chairman C.E. Thompson at 8:00 A.M., June 6, in the Keeneland Hall Room of the Hilton Inn, Lexington, Kentucky. The following Technical Committee members were present:

Arkansas - C.J. Brown, University of Arkansas, Fayetteville

Florida - J.R. Crockett, Agr. Res. & Edu. Ctr., Belle Glade

Georgia - W.E. Neville, Jr.**, Georgia Coastal Plain Exp. Sta., Tifton

Kentucky - F.A. Thrift, University of Kentucky, Lexington

Louisiana - D.E. Franke, Louisiana State University, Baton Rouge

North Carolina - E.U. Dillard, North Carolina State University, Raleigh

South Carolina - C.E. Thompson, Clemson University, Clemson

Tennessee - R.R. Shrode, University of Tennessee, Knoxville

Texas - C.R. Long, Texas A & M University, College Station

Virginia - T.J. Marlowe, VPI & SU, Blacksburg

Virgin Islands - H. Hupp, VI Agricultural Exp. Sta., St. Croix

Administrative Advisor - Doyle Chambers, Louisiana State Univeristy, Baton Rouge

Research Leader - W.T. Butts, Jr., ARS-USDA, University of Tennessee, Knoxville

Others attending were:

W.C. Burns - Brooksville Beef Cattle Research Center, Brooksville, Florida

F.M. Peacock - Agricultural Research Center, Ona, Florida

Bernard Smith - Georgia State Prison Farm, Reidsville, Georgia

Keith Gregory - U.S. Meat Animal Research Center, Clay Center, Nebraska

Bob McCurley - University of Tennessee, Knoxville, Tennessee

Larry Grimes - Clemson University, Clemson, South Carolina

**Representing W.C. McCormick

O.W. Robison - North Carolina State University, Raleigh, North Carolina

Earl L. Lasley - Farmers Hybrid Companies, Inc., Des Moines, Iowa

Hollis Chapman - Mississippi State University, Starkville, Mississippi

Dr. C.O. Little, Associate Director, Kentucky Agricultural Experiment Station and Dr. V.W. Hayes, Chairman, Animal Science Department welcomed the group to Lexington and the University of Kentucky.

Doyle Chambers gave his comments regarding S-10. He noted that S-10 is approved through September, 1981 and that work needs to be started on progress reports so that he can have them by the fall of 1980. He also mentioned that the proposed Regional Forage Research for Utilization by Beef Cattle is moving along and that the S-10 may be involved to some extent. He expressed strong feelings toward getting regional bulletins published.

Chairman Thompson appointed Drs. Dillard, Chapman and Hupp as the Resolution Committee.

Station progress reports were given by the following personnel from the various states:

Arkansas - C.J. Brown

Florida - J.R. Crockett

Georgia - W.E. Neville, Jr.

Kentucky - Fred A. Thrift

Due to lack of time the Louisiana report was deferred to later in the meeting. This session was adjourned at 9:30 A.M.

At 10:00 A.M. groups departed on tour of the area as noted in the accompanying program.

The meeting reconvened at 8:00 A.M., June 7, in the Red Mile Room at the Hilton Inn. Keith Gregory, USMARC, Clay Center, Nebraska presented a discussion on "Utilization of Genetic Diversity to Improve Efficiency of Beef Production". Earl Lasley, Des Moines, Iowa presented a "Review of Farmers Hybrid Cattle Breeding Program". Questions and discussion by the group followed the presentations. The sessions adjourned at 10:45 for a tour for the rest of the day.

The meeting reconvened June 8 at 8:30 A.M. at the Hilton Inn after an early morning visit to a ranch near Lexington.

The Louisiana report was given by Don Franke.

Dr. E.U. Dillard announced that he was retiring from the S-10 Committee and North Carolina State University, July 1, 1979. He said that Dr. Wayne Robison would temporarily serve as the Technical Committeeman from North Carolina State University. The eulogy was given by C.J. Brown and a hearty rendition, by the entire group, of "Jolly Good Fellow" was dedicated to Emmett.

Keith Gregory stated that if any one wanted to do cooperative work with USMARC they were welcome to do so and that USMARC would contribute to S-10 if they could.

The minutes of the mid-year meeting were approved.

C.J. Brown discussed regional publication on characterization of growth patterns of the Angus breed. The bulletin has been revised according to reviewers. He stated that the University of Arkansas can possibly publish the bulletin. C.J. has already discussed this with Doyle Chambers and will keep him advised as to the status of the publication. It was moved by Marlowe, a second by Shrode and passed that Arkansas publish the bulletin. Some discussion followed concerning authorship of the bulletin. Shrode moved and Marlowe seconded that C.J. Brown and Will T. Butts, Jr. should be co-authors. The motion was passed by voice vote. It was also directed that the Technical Committee be placed on a separate page. Brown asked and received permission to present the data at a national or regional meeting of animal scientists.

The subject was raised by Brown regarding the possibility of doing the same type of study with Polled Hereford as was done with the Angus. After much discussion, it was decided to proceed if data and help is available. Brown will contact other committeemen regarding data. Work with the Brahman was discussed but the subject was dropped due to the lack of sufficient data.

Don Franke discussed the status of the crossbreeding data and suggested looking at relative performance of all crosses using the Hereford or Hereford x Angus as a base to compare to. Marlowe suggested that Don contact committee members in the near future to describe what is needed and see what data will be available. Don agreed to the suggestion.

Will Butts gave the Research Leader's report and discussed the deadline for the project report and possible revision. He suggested each member to be thinking on this before the mid-year meeting. Butts will circulate a time schedule and what will be needed.

After Butts' report, there was considerable discussion concerning strengthening the position of the Research Leader with the S-10 group. Several voiced the opinion that he needs to be allowed more time and travel funds in order to be more involved in the contributing projects. The Technical Committee feels that he should be more available for consultation and coordination of the many contributing projects. It was decided that the Executive Committee should relate this feeling to the appropriate people.

Election of a new member to the Executive Committee was the next item of business. Shrode moved and Long seconded that T.J. Marlowe be elected by acclimation. The motion was passed by voice vote.

J.R. Crockett invited the group to Florida for the 1980 meeting. It was moved by C.J. Brown and seconded by Harold Hupp that S-10 accept the invitation. The motion passed.

The report of the Resolution Committee was made by Harold Hupp.

Report of the Resolution Committee of the S-10
Technical Committee Meeting, June 6-8, 1979,
Lexington, Kentucky

1. Whereas a great deal of effort went into the planning of the 1979 S-10 annual meeting, therefore be it resolved that this committee commend Dr. F.A. Thrift, Technical Committeeman, of the host University for having prepared a most interesting program and keeping the program on schedule.

2. Whereas the field tours were stimulating and informative therefore, be it resolved that the Secretary be authorized to write letters of appreciation to the management of Spendthrift Farms, Castleton Farms, Claiborne Farms, Arcadia Farm, Mint Springs Farm and Modern Cattle Management, Inc., for extending to this Committee and guests their many courtesies during visits of their operations.

3. Whereas the guest speakers, Drs. Keith Gregory and Early Lasley, presented stimulating and informative material, therefore, be it resolved that the Committee express its sincere appreciation to them for jobs well done and that letters of appreciation and copies of this resolution be sent to them.

It was moved by C.J. Brown, seconded by Charles Long and passed by unanimous vote that the following resolution be added:

> Whereas Dr. E.U. Dillard has had a long and meritous service with the S-10 Regional Beef Cattle Breeding Project and is now retiring from North Carolina State University, therefore, be it resolved that appreciation be expressed to Dr. Dillard' for his long and dedicated work in beef cattle improvement. Be it further resolved that a letter and copy of this resolution expressiong the feelings of this Committee be sent to Dr. Dillard, Dr. J.E. Legates, Dean of Agriculture and Dr. C.A. Lassiter, Chairman, Department of Animal Science, North Carolina State University.

Hupp moved and Franke seconded that the resolution be approved as read. Motion passed.

The 1979 meeting of S-10 was adjourned at 10:45 A.M., June 8, 1979.

ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECT
January 1 to December 31, 1979

1. PROJECT: Breeding Methods for Beef Cattle in the Southern Region. S-10.

2. COOPERATIVE AGENCIES AND PRINCIPAL LEADERS:

Cooperating State Experiment Stations and Technical Committee:

Alabama	T.B. Patterson	North Carolina	E.U. Dillard
Arkansas	C.J. Brown	South Carolina	C.E. Thompson
Florida	J.R. Crockett	Tennessee	R.R. Shrode
Georgia	W.C. McCormick	Texas	C.R. Long
Kentucky	Fred Thrift	Virginia	T.J. Marlowe
Louisiana	D.E. Franke	Virgin Islands	Harold Hupp

U.S. Department of Agriculture Agencies and Leaders:
W.T. Butts, Research Leader, S-10, SEA, AR, Knoxville, Tennessee
W.C. Burns, Location Leader, Brooksville Beef Cattle Research Station, Brooksville, Florida
E.H. Cobb, SEA, CR, Washington, D.C.

Regional Officers, 1978-79:
Doyle Chambers, Administrative Advisor, Baton Rouge, Louisiana
C.E. Thompson, Chairman, Clemson, South Carolina
J.R. Crockett, Secretary, Belle Glade, Florida
Harold Hupp, Executive Committee Member, Virgin Islands

3. PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS:

Six experiment station bulletins, 26 journal articles, 18 abstracts and 25 miscellaneous publications were reported from work associated with the regional project.

Six states reported results under Objective 1 of the Regional Project, i.e., to estimate general and specific combining ability and heterosis from various crosses. Breeds involved were Hereford, Angus, Shorthorn, Charolais, Brahman, Brangus, Simmental, Maine-Anjou, Limousin, Holstein and Jersey. General emphasis was on performance of a wide array of breed combinations and mating systems of interest to the industry. The third generation of a backcrossing study (Ala., 5-year averages) indicated similar performance for 1/8 Charolais, 1/8 Brown Swiss, 1/8 Holstein and Hereford cows when bred to Hereford bulls. The 1/8 Holstein cows weaned fewer kg of calf per cow bred than the other breed groups. Most of this difference was due to a 70% calf crop weaned in comparison with 80, 78 and 83% for Hereford, 1/8 Charolais and 1/8 Brown Swiss, respectively. Continuation of a Florida study produced calves by backcrossing F_1 females to Angus (A); Brangus (Bg); Hereford (H); Limousin (L); Maine-Anjou (MA) and Simmental (S) sires. Average unadjusted 205-day weights were: 3/4 Bg, 232kg; 3/4 S, 224kg; 3/4 MA, 215kg; 3/4 L, 210kg; Brangus (straightbred), 206kg; 3/4 Hereford, 205kg and 3/4 A, 202kg. A second study compared F_2 calves from crosses among Angus (A), Brahman (B) and Charolais (C). Mean 205-day weights were : A-B, 210-kg; A-C, 197kg and C-B, 220kg. Weights of straightbred calves were: A, 166kg; B, 176kg and C, 209kg. Heterosis levels of F_2 calves were estimated to be 22.5% for A-B, 4.8% for A-C and 14.4% for B-C. Maternal heterosis estimates attributed to F_1 cows were 19.3% for A-B, 3.1% for A-C and 1.2% for B-C. Phase II of a Louisiana study compared straightbred, two-breed rotation, three-breed rotation and four-breed rotation mating systems involving Hereford, Angus, Brahman and Charolais. Three-breed rotation females had higher calving and weaning rates (88.3 and 78.7%, respectively) and earlier calving dates than other groups. Two- and four-breed rotation cows

were similar with weaning rates of 64.8 and 64.4%, respectively. Heterosis estimates for weaning rate ranged from 7.4% for A_3B_1 to 45.4% for $C_2H_1B_1$ groups. Brahman sired two-breed rotation and Charolais sired four-breed rotation calves were heavier at birth than other groups. Adjusted weaning weights of all rotation bred calves were similar. Heterosis estimates indicate variable amounts of hybrid vigor among systems and breed combination within system; however, estimates for preweaning ADG and actual weaning weight appear larger for three-breed rotation calves than others. From a diallel involving Hereford, Angus, Brahman, Holstein and Jersey (Texas), heterosis was observed for weight (7 to 14%) and height (2 to 4%) in bulls and heifers. Management (pasture vs individual feeding) affected level of heterosis observed in heifers. Preliminary analyses of records of cows producing first and second inter se calves provided average heterosis estimates for age at first parturition (-5.4%), postpartum interval (-4.6%), calving interval (-.5%), calves born alive (9.0%), calves weaned of calves born (11.3%), parturition weight (5.8%) and parturition height (2.4%). Eighteen herds of crossbred females and eleven herds of straightbred cows (Va.) provided an extensive comparison of cow performance. Measured by kg of calf weaned per cow exposed (first calf heifers), all crossbred groups of heifers were superior to straightbred groups with the exception of one Angus and one Hereford group. North Carolina data from purebred and crossbred cattle of Angus, Hereford and Charolais breeding were used to estimate breed additive, heterotic, breed maternal and average maternal heterosis effects for birth weight, preweaning ADG, weaning weight and type score. Charolais additive effects (deviations from the Hereford) were positive ($P<.05$) for birth weight, ADG and weaning weight. Angus additive effects were negative for birth weight. Charolais maternal effects exceeded those for Hereford and Angus for all traits. Angus maternal effects exceeded Hereford for all weight traits. Direct heterosis effects were significant for all traits except birth weight. Estimates were 2.4, 3.8, 3.9 and 3.7% for birth weight, ADG, weaning weight and type score, respectively. Maternal heterosis was significant for ADG and weaning weight.

Heritability estimates were obtained from paternal half sibs (N. Carolina) by analysis of variance (ANOVA) and chi-squares (X^2). Estimates for binary variables were corrected to a normal basis (ANOVA-C and X^2-C). For calving rate at 2 years of age these estimates were .00±.10 (ANOVA), .13±.09 (X^2) and .22±.12 (X^2-C). When heifers that failed to calve at either 2 or 3 years of age were excluded from the data, the estimates were: .25±.15 (ANOVA), .54±.21 (ANOVA-C), .22±.14 (X^2) and .48±.20 (X^2-C). Estimates of heritability for perinatal mortality were: .64±.21 (ANOVA), 1.25±.35 (ANOVA-C), .61±.25 (X^2) and 1.19±.32 (X-C). Heritability of services per conception was estimated at .35±.22.

A number of stations reported work addressed to characterization of genotype or identification of environmental effects likely to affect genotypic recognition. A regional study characterizing growth profiles of Angus cattle from 11 contributing stations found 76.6% of variation in mature size attributable to among herd differences and 23.5% to animal differences within herds. Variation in rate of maturing was more evenly balanced with 57.6% among herds and 42.4% within herds. Preweaning rate of gain was similar to rate of maturing with 61.5% of the variation due to herd differences and 38.5% due to within herd differences. In contrast to weight variables, 95.8% of the variation in pregnancy rate was attributable to within herd differences. Since reproduction is an important part of culling procedures in all herds contributing to this study, this pattern of variance partitioning may suggest that size and reproductive performance interact with specific production situations. Alabama found that calves from fast maturing groups (herds) weighed 96% as much as calves from slow maturing groups, but gained only 81% as fast as slow maturing calves postweaning. Tennessee found that sire of the fetus carried by the cow affected preweaning ADG, type and condition and postweaning type and condition

of the currently nursed calf. No explanation is available for this phenomenon, but the effect was observed in an Angus herd at one location and a Hereford herd at a second location. Steers from the crossbred lines in the Louisiana contributing study were finished on two postweaning regimes, i.e., 200 days in the feedlot or 200 days on pasture followed by 70 days in the feedlot. No interaction was apparent between line and finishing regime. Carcasses from the 200-day feedlot group were fatter and exhibited lower W-B shear values than did carcasses from the delayed feeding group. In a comparison of Angus, Hereford, Santa Gertrudis and Charolais sires bred to Angus and Hereford cows, Arkansas found that steers sired by Angus and Hereford bulls had more tender psoas major muscles. Sire differences were not significant on the tenderness of longissimus or quadriceps femoris muscles. Low, but significant, correlations were found between tenderness and either sarcomere length, fiber diameter, or decreases in fiber diameter or sarcomere length due to cooking.

A total of 1266 antilymphocytic antisera have been collected from various breeds of cattle (Tex.). Most of these have been screened for antibody activity and those determined useful were placed in the routine typing test. Population and family studies have revealed the existance of nine alleles at the BoLA A locus. Tentative evidence is also available for a linked locus (BoLA B). Research has also been initiated to determine the presence of immune response genes via testing for B lymphocyte antigens.

4. USEFULLNESS OF FINDINGS:

Beef production is perhaps the most dynamic of the major agricultural enterprises. Results from the S-10 Project have contributed a significant amount of the information delineating the components of overall production efficiency. The present level of sophistication of the industry, as evidenced by its ability to cope with rapidly changing production situations in recent years, is a testimonial to the adequacy of past beef cattle research. The complementarity of the studies contribuing to the present S-10 project and the resulting comprehensivness of the overall project should provide the information needed for decision making by cattle managers in the future.

5. WORKED PLANNED FOR NEXT YEAR:

Investigations will proceed according to project outline, revised August, 1975. The Project Statement will be revised to reflect the continued evolution of contributing projects.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS APPROVED DURING THE YEAR:

See attached list.

7. APPROVED:

March 4, 1980
(Date)

L. A. Swiger
Chairman, Technical Committee

Mar 7, 1980
(Date)

Regional Administrative Advisor

STATE REPORTS

AUBURN UNIVERSITY
Agricultural Experiment Station
Auburn, Alabama

I. PROJECT: Hatch 428 (S-10)
Parameters Associated with Growth Rate Curves in Beef Cattle

II. OBJECTIVES:

To evaluate changes in growth curves in beef cattle while selecting for growth rate at early and late stages of maturity.

To relate production efficiency to variation associated with differences in rate of maturing.

To determine the relationship between the rate of utilization of metabolic hormones and rate of growth.

III. PERSONNEL:

T. B. Patterson and D. N. Marple

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

The relationship among the variables growth rate, economics of production and mature size in beef cattle are known. However, most of the selection for growth rate was done without regard to the effect on mature size. Information is needed therefore, to determine if growth rate can be increased during the early stages of growth, i.e. from birth to 450 days of age, without a significant increase in mature weight.

Data on feed required for maintenance and growth associated with these differences in growth rate and maturity patterns are needed. Also, the relationship between growth rate patterns and composition of gain is essential if successful breeding programs are to be formulated.

The recent increased emphasis on metabolic efficiency or the ability of animals to convert forages and concentrates into muscle protein has stimulated research on the regulation of muscle growth and nutrient conservation. The expression of genetic potential for growth, specifically muscle growth, is regulated by metabolic hormones. If the mechanisms or interactions of these hormones can be defined, researchers and livestock producers would be provided with an additional tool to identify and select animals of superior growth potential and efficiency at an early period of the animal's growth curve.

Approximately 100 each of purebred Angus, Charolais and Hereford cows will be divided into two groups on the basis of early and late rate of maturing. Individual weight records as well as body type, indicative of rate of maturing in cattle, will be used in making the herd division.

These cows will be bred to purebred bulls within breed groups selected on the same basis as was used to divide the cows. The source of bulls will be from herds with sufficient records to estimate selection differential and to make sure that bulls with correct genotype for rate of maturity are secured. In addition, sources of bulls will be sampled so that inbreeding is held to a low level.

Selection of replacement females will be on a within breed-group basis. Selection in the early maturing herds will be by index for early growth rate from birth to one year as a ratio of growth rate from birth to 18 months of age. Selection in the late maturing herd will be for rapid growth from birth to 18 months of age.

Weights will be recorded on all calves at birth and at 90-day intervals until herd replacements, both male and female, are selected. Thereafter weights will be recorded on each female at calving and at weaning. Weights will be recorded on each bull at the beginning of the breeding season.

All females will be exposed for breeding so as to calve first as two year olds. Cow will be recorded as open or calving, absence of or level of dystocia and weaned or failed to wean a calf.

All cows and calves will be subjected to the same general environmental conditions. Cow groups will be rotated on Spring, Summer and Fall pastures to minimize differences. Winter feeding will consist of a full feed of corn silage with protein supplement added as needed. The calves will receive creep when supplemental feed is indicated to insure maximum growth. Creep feeding will be started in all groups at the same time and once started it will be continued until weaning.

During the post-weaning period all calves will be full fed corn silage within groups on a breed-sex-rate of maturing basis. The heifers will receive supplement in the form of protein and energy at a level to produce average gain of approximately 1.5 pounds per day. The bull calves will receive the same supplements but at a level sufficient to insure maximum expression of genetic ability to gain.

Samples of three or more animals will be selected from each breed-sex-rate of maturing group shortly after birth. All animals will be weaned at 3 months of age, individually fed and daily consumption recorded.

Biopsies will be taken at 3-month intervals from the longissimus dorsi or semimembranosis muscles and prepared according to the procedure of Hagarty and Naude (7) to determine muscle fiber diameter. Mean muscle fiber diameter will be plotted against age and will be used to monitor muscle growth rate. Body composition will be estimated at each biopsy using predictive equations based on ultrasonically determined fat thickness over the loin at the 12th rib and body weight.

The metabolic clearance and/or biological half-life of growth hormone, testosterone, thyroxine and triiodathyronine will be determined in cattle at 3, 6, 9, 12, 15, 18 and 21 months of age. The determination will be made first using bulls and secondly using steers with experiments replicated over years.

2. Research results.

The first set of calves from the purebred Angus and Hereford cows have completed the post-weaning performance test and herd replacements selected. A second calf crop, which included a small number of Charolais calves, has been weaned and is now on post-weaning test.

The fast maturing calves weighed approximately 96 percent as much as the slow maturing calves at weaning. However, they gained only 81% as fast as the slow maturing calves huring the post-weaning period.

V. FUTURE PLANS:

The project will continue as outlined.

VI. PUBLICATIONS DURING THE YEAR:

None.

VII. PUBLICATIONS PLANNED:

None.

I. PROJECT: Animal Science 4-017

The Effects of Breed and Breed Crosses on Milk Production and on Other Production Factors in a Grade Beef Herd

II. OBJECTIVES:

To determine the effect of Brown Swiss, Holstein and Charolais breeding on (a) milk production, (b) weaning weights and grades, (c) feedlot performance and (d) carcass desirability.

III. PERSONNEL:

T. B. Patterson and R. A. Moore

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

Many of the commercial beef herds in the Southeast were established with common cows of predominately dairy breeding as foundation females. Purebred beef bulls were used in a grading up process. Most of the build up in numbers and subsequent grading up process occurred within the past 15-20 years when market price and demand favored a so called "milk fat calf". Consumer preference has changed over the past five to ten years to a demand for heavier beef. Nevertheless, most commercial producers in Alabama still market their calves at weaning, and total weight and price per cwt. determine gross receipts.

In the opinion of many commercial breeders there is an apparent reduction of milking abilities of brood cows associated with the grading up process. Milk is the most important source of quality nutrients in the diet of the beef calf. Producers are faced with the choice of reverting to the original type cows that are often lacking in beef conformation and/or inherent ability to gain, or attempting to improve milk production within the existing herd through phenotypic selection. Obviously, improvement in milk production can be accomplished most rapidly through the use of selected sires since a sire constitutes roughly one-half of the genetic make-up of the herd.

Seventy-five grade beef cows were divided into similar groups of 25 each on the basis of age, breeding and previous production record each year. They were bred to Hereford (control), Brown Swiss and Charolais bulls. The bulls were changed each year. A group of Holstein and Hostein-Jersey cows were bred to the Hereford bulls.

Additional information such as milk production of the original cows at 90 and 250 days of lactation was established. Production information on all calves to weaning can be related to milk production of their dams. Post wenaing performance and carcass data on all steer calves provided information on the effects of breeding on production.

All physically sound heifers produced by the procedure described above have been retained until approximately 25 breeding age females per breeding group were available. These heifers were bred to closely related Hereford bulls selected from a high producing herd. Only bulls with above average weaned weights were considered. Milk production obtained from this set of females will provide a comparison with the original and with subsequent herd milk production levels. Milk production and breed of dam is confounded however, differences in calf weanined weights reflects these two important brood cow characteristics.

All steer calves are full fed on corn silage plus supplement until they have reached 1,000 lbs. and average in the Choice grade. Carcass data are obtained on all steers. As before, all physically sound heifers are retained as replacements for the next generation.

2. Research results.

The fifth and last set of calves from the third and final generation of backcross cows were weaned and the steer calves are currently in the feed lot, slaughtered and carcass data obtained. These data are summarized in tables 1, 2 and 3.

Since all cows were either straightbred Herefords (the controls) or 7/8 Hereford backcrosses, it was not expected that the backcrosses would perform differently from the controls. The 1/8 Holstein cows weaned fewer kg. of calf per cow bred than any other breed group. However, most of this difference was due to percent calf crop weaned rather than a difference in adjusted weaning weight.

There were no significant differences in feed lot performance among the breeding groups or for any of the carcass characteristics measured.

V. FUTURE PLANS:

The project will continue as outlined.

VI. PUBLICATIONS DURING THE YEAR:

None.

VII. PUBLICATIONS PLANNED:

Experiment Station Bulletin.

Table 1. Pre-weaning performance traits for third generation cows and their calves. Five year average.

	Breeding of cows[1]			
	Hereford	7/8 Hereford 1/8 Charolais	7/8 Hereford 1/8 Brown Swiss	7/8 Hereford 1/8 Holstein
No. of cows bred	89	99	107	97
No. of calves born	76	83[3]	95[3]	82
No. of calves weaned	71	77	89	68
Percentages weaned	79.8	77.8	83.2	70.1
Avg. adj. weaning wt., Kg.	203.5	214.4	211.2	207.4
Avg. Kg. calf/cow bred	162.4	166.8	175.7	145.4
Avg. stocker grade[2]	13.2	13.5	13.3	13.4

1/ All cows bred to Hereford bulls.
2/ 12 = low Choice; 13 = Choice; 14 = high Choice, etc.
3/ Includes one set of twins.

Table 2. Feed lot performance for steers from third generation cows. Four year average.

	Breed of steers			
	Hereford	15/16 Hereford 1/16 Charolais	15/16 Hereford 1/16 Brown Swiss	15/16 Hereford 1/16 Holstein
No. of steers	26	27	40	18
Avg. initial wt., Kg.	235.2	250.5	238.4	246.7
Avg. final wt., Kg.	411.3	440.2	414.9	432.6
Avg. daily gain, Kg.	.78	.85	.79	.81
Avg. slaughter grade[1]	12.0	12.0	12.1	12.3

1/ 12 = low Choice; 13 = Choice, etc.

Table 3. Carcass data for steers from third generation cows. Four year average.

	Breed of steers			
	Hereford	15/16 Hereford 1/16 Charolais	15/16 Hereford 1/16 Brown Swiss	15/16 Hereford 1/16 Holstein
No. of steers	26	27	40	18
Avg. hot carcass wt., Kg.	251.1	266.4	244.9	264.4
Avg. rib fat, cm.	.90	.85	.86	.84
Avg. rib eye area, sq. cm.	26.2	27.3	25.3	27.4
Avg. yield grade[1]	2.7	2.6	2.7	2.6
Avg. carcass grade[2]	11.6	11.3	11.4	11.0

1/ 1 = best --- 5 = poorest.
2/ 11 = high Good; 12 = low Choice; 13 = Choice, etc.

AL 8

23

Production, Inventory and Performance Data, S-10 Herds - 1979

State Alabama

Location		Milstead	Milstead	Milstead	Milstead	Milstead
Breed of sire		Angus	Angus	Hereford	Hereford	Charolais
Breed of dam		Angus	Angus	Hereford	Hereford	Charolais
Line or group[1]		Slow Maturing	Fast Maturing	Slow Maturing	Fast Maturing	Slow Maturing
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	57	49	40	40	44
	Yearling heifers	9	7	6	6	0
	Bulls and steers under 1 year	19	10	10	16	4
	Heifers under 1 year	18	27	16	11	5
	Bulls over 1 year	2	2	2	2	1
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	84	83	88	83	--
	Calf survival percent[3]	91	95	93	93	--
Wean. perf.	Adj. ADG[4] Kg	.88	.83	.81	.63	.73
	Ave. type sc.[5]	14.0	13.7	14.1	13.9	13.9
Postweaning performance	No. of bulls	25	15	6	6	0
	No. of heifers	14	11	9	11	0
	No. of steers	0	0	0	0	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	0
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: Constant age, mature dam, steer equivalent.

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Alabama

Location		Milstead	Winfield	Winfield	Winfield	Winfield
Breed of sire		Charolais	Hereford	Hereford	Hereford	Hereford
Breed of dam		Charolais	Hereford	7/8 Hereford 1/8 Charolais	7/8 Hereford 1/8 Brown S.	7/8 Hereford 1/8 Hostein
Line or group[1]		Fast Maturing	Straight-bred	Back-cross	Back-cross	Back-cross
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	42	--	--	--	--
	Yearling heifers	0	--	--	--	--
	Bulls and steers under 1 year	4	--	--	--	--
	Heifers under 1 year	4	--	--	--	--
	Bulls over 1 year	1	--	--	--	--
	Steers over 1 year	0	9	6	6	5
Repro. perf.	Percent pregnant[2]	--	95	83	100	88
	Calf survival percent[3]	--	94	93	95	80
Wean. perf.	Adj. ADG[4] Kg	1.01	.68	.72	.72	.71
	Ave. type sc.[5]	14.1	13.6	13.9	13.5	13.8
Postweaning performance	No. of bulls	0	0	0	0	0
	No. of heifers	0	8	8	7	11
	No. of steers	0	8	10	12	4
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	8	10	12	4
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: Constant age, mature dam, steer equivalent.

[5]Suggest S-10 scoring system; indicate if different.

UNIVERSITY OF ARKANSAS
Agricultural Experiment Station
Fayetteville, Arkansas

I. PROJECT: Hatch 170

Evaluation of Performance Records of Beef Cattle

II. OBJECTIVES:

Continue to develop practical but adequate methods of identifying, evaluating and propagating the genetic potential for the production of beef.

III. PERSONNEL:

C.J. Brown, R.S. Honea, L.O. Brown

IV. ACCOMPLISHMENTS DURING THE YEAR:

Purebred herds of Polled Hereford, Hereford, Angus, Red Poll and Charolais continue to be maintained at the Main Experiment Station as indicated by the accompaning inventory sheets. Purebreed Santa Gertrudis will continue to be maintained at the Pinetree Research Station.

Reorganization of the work at several of the Branch Experiment Stations will reduce the opportunity to interface the breeding work with the nutrition and management projects. The cooperative work with the dairy breeding group at the Livestock and Forestry Station in which the maternal ability of exotic breed bulls and Holstein cows was being evaluated will be phased out. The crossbreeding involving crisscross mating systems with beef and dairy breeds at the Pinetree Station will be discontinued. Continued at that station will be work with the Santa Gertrudis, the Growth Potential herd and certain Brahman type crosses. A separate project dealing with genotype x environment interactions and adaptability has been initiated as a cooperative effort between the Monticello Station and the Main Station. Work on summarizing the studies that have been completed or phased out in the reorganization is in progress.

Cooperative work with the livestock entomologist at the Main Station on tick and face fly populations and at the Pinetree Station on Horsefly populations are continuing.

Analyses of several data sets have been made during the year and reported in the various publications cited below. Particular attention should be drawn to the Regional bulletin on Size and Growth of Angus cows and to the bulletin dealing with Canonical analyses of body measurements and partial records of young bulls on postweaning gain test.

V. PUBLICATIONS:

Brown, C.J., Zelpha Johnson and A. Hayden Brown. 1979. Estimates of Partial Efficiency of Young Beef Bulls. J. Anim. Sci. (Manuscript submitted).

Conoway, Howard H., Connell J. Brown, Louis L. Saunders, Stanley F. Cernosek, Harold E. Farris, Sanford I. Roth. 1979. Spontaneous Diabetes Meleitus in the New Zealand White Rabbit, History, Classification and Genetic Analysis. J. Heredity (Accepted for March-April Issue).

Brown, C.J. and M.L. Ray. 1979. Interactions Among Year, Sex, Sire and Dam Breeds in Weaning Traits of Beef Calves. J. Anim. Sci. 48 (Abstr.).

Brown, C.J. and W.T. Butts. 1980. Size and Growth Characteristics of Angus Cows in the Sothern Region. J. Anim. Sci. 49 (Abstr.).

Aman, Ahmed, C.J. Brown and Z. Johnson. 1979. Relationship of Growth Parameters and Certain Reproductive Traits. J. Anim. Sci. 48 (Abstr.).

Brown, A.H., Zelpha Johnson and C.J. Brown. 1979. Relationships Among Postweaning Body Measurements and Feedlot Performance of Bulls. J. Anim. Sci. 48 (Abstr.).

Johnson, Zelpha B., A.H. Brown and C.J. Brown. 1979. Canonical Correlation Analyses of Postweaning Body Measurements and Feedlot Performance of Bulls. J. Anim. Sci. 48 (Abstr.).

Brown, A.H., Zelpha Johnson and C.J. Brown. 1980. The Relationships of Absolute and Relative Growth Rate in Bulls of Two Beef Breeds Developmed in Postweaning Feedlot Performance Tests. J. Anim. Sci. 49 (Abstr.).

Johnson, Zelpha, A.H. Brown and C.J. Brown. 1980. The Relationship of Feed Efficiency to Absolute and Relative Growth Rate in Bulls of Two Breeds Developed in Postweaning Feedlot Performance Tests. J. Anim. Sci. (Abstr.).

Brown, C.J. and W.T. Butts. 1979. Size and Growth Characteristics of Angus Cows in the Southern Region. So. Regional Cooperative Series Bulletin #240.

Brown, C.J. (assembled and prepared for publication)
King Foundation Visiting Scholar Lectures for 1978. Ark. Agri Espt. Special Report 172.

Johnson, Zelpha, A.H. Brown and C.J. Brown. 1979. Canonical Correlation Analyses of Postweaning Body Measurements and Feedlot Performance of Bulls. Ark. Expt. Sta. Bul. (manuscript approved for publication).

Brown, A.H., C.J. Brown and Zelpha Johnson. 1979. Relationships Among Postweaning Body Measurements and Feedlot Performance of Bulls. Ark. Agri. Expt. Sta. Mimeo. 269.

Brown, A.H., C.J. Brown and L.O. Brown. 1979. Performance of Bulls on Arkansas Cooperative Beef Bull Performance Test 17. Ark. Agri. Expt. Sta. Report Series 248.

Brown, C.J. 1979. Trends in Performance of Bulls in Tested Beef Herds. Ark. Farm Research, Vol. 28, No. 4.

Brown, A.H., C.J. Brown and Zelpha Johnson. 1979. Relationships Among Postweaning Body Measurements and Feedlot Performance of Bulls. Ark. Farm Research, Vol. 28, No. 3.

Ray, Maurice L. and C.J. Brown. 1979. Effect of Breed of Sire on Birth Weight and Mortality of Beef Calves. Ark. Farm Research, Vol. 28, No. 1 Reprinted in Red Poll News, Vol. 38, No. 1.

Ahmad, A. 1979. Relationship of Growth Parameters to Certain Reproductive Traits. Ph.D. Thesis, University of Arkansas, Fayetteville, 110 p.

Forrester, S. 1979. Relationship of Showring Placing to Certain Objective Measurements Taken at the American Angus Breeders Futurity. M.S. Thesis. University of Arkansas, Fayetteville.

AR 4
28

Production, Inventory and Performance Data, S-10 Herds - 1979

State Arkansas

Location		Main Sta.	Main Sta.	Main Sta.	Main Sta.	Main Sta.
Breed of sire		Angus	Hereford	P. Hereford	Charolais	Red Poll
Breed of dam		Angus	Hereford	P. Hereford	Charolais	Red Poll
Line or group[1]		Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	122	46	66	20	21
	Yearling heifers	30	8	17	5	4
	Bulls and steers under 1 year	21	11	16	8	2
	Heifers under 1 year	46	8	24	12	3
	Bulls over 1 year	7	3	3	2	4
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	86%	83%	90%	72%	85%
	Calf survival percent[3]	92%	92%	86%	83%	92%
Wean. perf.	Adj. ADG[4]	1.50	1.70	1.51	1.84	1.71
	Ave. type sc.[5]	13	12	13	13	13
Postweaning performance	No. of bulls	21	11	16	8	2
	No. of heifers	46	8	24	12	3
	No. of steers	0	0	0	0	0
Slaughtered	No. of bulls	4	2	4	0	9
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	0
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

UNIVERSITY OF FLORIDA
Agricultural Research and Education Center
Belle Glade, Florida

I. PROJECT: FLA-EV-01982 (S-10)

Breeding methods for beef cattle in the Southern Region

II. PURPOSE:

Project FLA-EV-01982 serves a coordinating role of all Animal Breeding projects of the Florida Agricultural Experiment Station which contribute to Regional Project S-10.

III. PERSONNEL:

J.R. Crockett, M. Koger, T.A. Olsen and F.M. Peacock

IV. ACCOMPLISHMENTS DURING THE YEAR:

The study of fertility, growth and maternal ability in Angus, Brahman and Charolais and crosses of those breeds was continued at the Research Center at Ona. The progress report of the 1979 calves show the 205-day weights of straightbred calves were 166, 176 and 209 kg, respectively, for Angus (A), Brahman (B) and Charolais (C) calves. Calves from F_1 inter-se matings averaged 210 kg (A-B), 197 kg (A-C) and 220 kg (C-B). Heterosis levels were estimated to be 22.5% for A-B, 4.8% for A-C and 14.4% for B-C F_2 calves. Maternal heterosis estimates attributed to F_1 cows were 19.3% for AB, 3.1% for AC and 1.2% for BC cows.

The study at Belle Glade comparing exotic sires for commercial beef production involved six crossbred groups and one straightbred group (Brangus) for the 1979 calf crop. The crossbred calves were produced by backcrossing the F_1 females to Angus (A); Brangus (Bg); Hereford (H); Limousin (L); Maine-Anjou (MA); and Simmental (S) sires. Average unadjusted 205-day weights were: 3/4 Bg, 232 kg; 3/4 S, 224 kg; 3/4 MS, 215 kg; 3/4 L, 210 kg; Brangus, 206 kg; 3/4 H, 205 kg; 3/4 A, 202 kg.

The Hereford cow herd at the Brighton Seminole Indian Reservation has been subdivided into three herds with two-thirds being upgraded to Beef master and Braford and the remaining herd continued as grade Hereford. The 1979 unadjusted 205-day weight were 216, 208 and 198 kg for Beefmaster, Braford and Hereford sired calves, respectively.

V. FUTURE PLANS:

The projects at Ona will continue as outlined in the project statements.

At Belle Glade, the Limousin has been eliminated from the study as it enters the third phase. The Simmental F_1 females will be bred to 3/4 Simmental 1/4 Brahman sires and the Maine-Anjou F_1 females will be mated to Brahman sires to produce a three breed cross. The Beefmaster upgrading females have

been assigned to another study. Feedlot and carcass information will be continued on steer progeny from all breed groups.

Bulls produced in the Brighton herd will be evaluated in cooperators herds

VI. PUBLICATIONS:

Peacock, F.M., M. Koger, E.M. Hodges, J.R. Crockett and A.C. Warnick. 1979. Beef production from straightbred and reciprocal crossing of Angus, Brahman and Charolais cattle. Fla. Agr. Expt. Sta. Tech. Bul. 810.

Crockett, J.R., F.S. Baker, Jr., J.W. Carpenter and M. Koger. 1979. Pre-weaning, feedlot and carcass characteristics of calves sired by Continental, Brahman and Brahman-derivative sires in sub-tropical Florida. J. Anim. Sci. 49:900.

Crockett, J.R. 1979. Performance of exotics in the Everglades. Proc. 28th Beef Cattle Short Course. Gainesville, Florida, May 2-4, 1979.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		Belle Glade	Belle Glade	Belle Glade	Belle Glade	Belle Glade
Breed of sire		Beef Master	Brahman	Brangus	Limousin	Maine-Anjou
Breed of dam		various	various	various	various	various
Line or group[1]						
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	86	2	34	7	12
	Yearling heifers	24	-	7	-	-
	Bulls and steers under 1 year	12	1	15	4	5
	Heifers under 1 year	22	1	11	3	4
	Bulls over 1 year					
	Steers over 1 year	16	2	5	1	-
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]	88	100	78	100	100
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]	100	100	100	100	75
Postweaning performance	No. of bulls					
	No. of heifers	2.05	2.15	2.02	1.96	2.04
	No. of steers					
Slaughtered	No. of bulls	11	12	12	11	11
	No. of heifers					
	No. of steers					
Remarks		Percent pregnant of Brahman, Limousin, Maine-Anjou and Simmental is only for cows conceiving by A.I. Other groups by natural service.				

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

FL 4
32

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		Belle Glade	Belle Glade	Belle Glade		
Breed of sire		Simmental	Angus	Hereford		
Breed of dam		various	various	various		
Line or group[1]						
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	14	24	27		
	Yearling heifers	3	-	-		
	Bulls and steers under 1 year	10	8	13		
	Heifers under 1 year	3	16	13		
	Bulls over 1 year					
	Steers over 1 year	1	12	9		
Repro. perf.	Percent pregnant[2]	100	100	92		
	Calf survival percent[3]	93	100	96		
Wean. perf.	Adj. ADG[4]	2.09	1.90	1.94		
	Ave. type sc.[5]	12	12	12		
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		Brighton	Brighton	Brighton	Brighton	Brighton
Breed of sire		Beef Master	Braford	Grade Hereford	Beef Master	Brangus
Breed of dam		Grade Hereford	Grade Hereford	Grade Hereford	Brangus x	Brangus
Line or group[1]						
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	74	81	68	55	84
	Yearling heifers	30	24	32	67	(Combined)
	Bulls and steers under 1 year	36	35	27	23	35
	Heifers under 1 year	26	27	29	23	37
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	87	77	75	93	77
	Calf survival percent[3]	97	97	97	95	99
Wean. perf.	Adj. ADG[4]	1.99	1.90	1.77	1.76	1.68
	Ave. type sc.[5]	12	12	12	-	-
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		Beef Res. Unit	Beef Res. Unit	Beef Res. Unit	Beef Res. Unit	Beef Res. Unit
Breed of sire		Angus	Brown Swiss	Angus or Swiss	Swiss	Angus
Breed of dam		Angus	Brown Swiss	Angus or Swiss	F_1	F_1
Line or group[1]				F_1	Backcriss	Backcross
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	35	33	6	23	22
	Yearling heifers	15	12	12	-	-
	Bulls and steers under 1 year	12	5	8	7	9
	Heifers under 1 year	9	9	17	-	-
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	88	66	100	87	91
	Calf survival percent[3]	95	81	100	84	95
Wean. perf.	Adj. ADG[4]	1.69	2.38	2.11	2.11	1.91
	Ave. type sc.[5]	2.5	5	3	4	3
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		RCS Ona	RCS Ona	RCS Ona	RCS Ona	RCS Ona
Breed of sire		-	Angus	Angus	Angus	Angus
Breed of dam		-	Angus	Ang x Brah.	Ang. x Char.	Brah. x Char
Line or group[1]		Station mean				
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	612	11	8	11	3
	Yearling heifers	212				
	Bulls and steers under 1 year	181				
	Heifers under 1 year	164				
	Bulls over 1 year	83				
	Steers over 1 year	168				
Repro. perf.	Percent pregnant[2]	92	100	100	100	100
	Calf survival percent[3]	92	100	100	100	100
Wean. perf.	Adj. ADG[4]	1.86	1.54	1.89	1.72	1.69
	Ave. type sc.[5]	12	12	12	12	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

FL 8
36

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		RCS Ona	RCS Ona	RCS Ona	RCS Ona	RCS Ona
Breed of sire		Brahman	Brahman	Brahman	Brahman	Charolais
Breed of dam		Brahman	Charolais	Brah. x Ang	Ang x Char	Charolais
Line or group[1]						
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	12	7	8	5	12
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	83	(twins) 114	75	80	92
	Calf survival percent[3]	90	100	50	100	91
Wean. perf.	Adj. ADG[4]	1.63	1.80	1.48	2.03	1.85
	Ave. type sc.[5]	10	12	11	12	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		RCS Ona	RCS Ons	RCS Ona	RCS Ona	RCS Ona
Breed of sire		Charolais	Charolais	Charolais	F_1-AxB	F_1-AxB
Breed of dam		Ang x Brah	Ang x Char	Char x Brah	Angus	Brahman
Line or group[1]						
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	5	7	10	4	3
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	100	100	90	75	100
	Calf survival percent[3]	100	100	100	100	100
Wean. perf.	Adj. ADG[4]	2.21	1.88	2.28	1.76	1.48
	Ave. type sc.[5]	13	12	12	12	11
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

FL 10
38

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		RCS Ona	RCS Ona	RCS Ona	RCS Ona	RCS Ona
Breed of sire		F_1-AxC	F_1-BxC	F_1-BxC	F_1-BxC	F_1-BxC
Breed of dam		F_1-AxC	Angus	Brahman	Charolais	F_1-BxC
Line or group[1]		inter se				inter se
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	21	4	3	4	24
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	100	100	100	75	100
	Calf survival percent[3]	90	100	100	100	92
Wean. perf.	Adj. ADG[4]	1.80	1.83	1.86	2.30	2.05
	Ave. type sc.[5]	13	12	11	12	12
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Florida

Location		RCS Ona	RCS Ona			
Breed of sire		Santa Gert.	Brahman			
Breed of dam						
Line or group[1]						
Percent used in project						
Inventory as of December 31, 1979	Cows 2 years and over	33	44			
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	79	84			
	Calf survival percent[3]	73	92			
Wean. perf.	Adj. ADG[4]	1.99	1.72			
	Ave. type sc.[5]	12	11			
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

GEORGIA COASTAL PLAIN EXPERIMENT STATION
Tifton, Georgia

I. PROJECT: Hatch 224 (S-10)

II. OBJECTIVES:

To estimate general combining ability of breeds, specific combining ability in breed crosses and heterosis of various types of crosses.

To compare performance of crossbred Simmental x Polled Hereford cattle with Polled Herefords and ultimately grade up to purebred Simmentals.

III. PERSONNEL:

W.E. Neville, Jr. and W.C. McCormick

IV. ACCOMPLISHMENTS DURING THE YEAR:

Tifton. The Angus and Polled Hereford cows were mated naturally while the Simmental-cross cows were synchronized with Syncromate-B and artificially inseminated. A purebred Simmental bull was turned with the Simmental-cross cows 24 days after synchronization date to serve as a "clean-up" bull. Twenty-four 7/8, 15/16 and 31/32 were born and 21 were weaned in 1979. Calves of all three breeds were born in January to March and weaned in September. Bull and cull heifer calves from the previous year's calf crop were fed postweaning to compare the performance on slotted floor vs conventional feedlot and control, control + Rumensin (30 gm/ton) and control diet limited to intake of control + Rumensin. Replacement females were selected at weaning and fed to gain at a moderate rate post-weaning.

Table 1 is a summary of 140-day ADG of bulls by breed, sire, facility and diet. Table 2 is a summary of the 126-day performance of cull heifers fed by facility and diet and and the 176-day performance of replacement heifers by breed.

Reidsville. A third calf crop was produced which contained straightbred Angus (A), Santa Gertrudis (SG) and their F_1 crosses and reciprocal crosses (A x SG, SG x A). These calves were weaned in the fall and have been put on post-weaning feeding.

The post-weaning performance of straightbred bulls of Angus and Santa Gertrudis and their reciprocal crosses (F_1) from last year's calf crop is given in table 3. Of these bulls, 4 Angus, 4 Santa Gertrudis, 2 A x SG and 2 SG x A, which averaged 770, 848, 900 and 860 lb, respectively as yearlings at the start of the breeding period, were put with 25 grade Polled Hereford cows during this year's 90-day breeding period. None of the bulls was observed to have any difficulty during the breeding period.

Bulls from the first year's calf crop sired calves that were weaned this fall. Average (range) of percent calf crop born was 84% (68-92) for 3 SG bulls (one bull was intertile), 85% (80-92) for 4 A and 85% (76-96) for 2 A x SG and 2 SG x A (no difference due to reciprocals). These percentages were similar to calf crops from mature bulls which averaged 85% (976-89) for 4 SG and 86% (78-95) for 4 Angus. The 205-day weight adjusted for age of dam and sex (steer basis) of calves from these yearling bulls were 396, 434, 408 and 427 lb by sires of Angus, Santa Gertrudis, A x SG and SG x A, respectively. Post-weaning performance of the steer calves by these sires will be obtained.

Plains. For the second year, 2 purebred Angus and 2 Simmental (7/8) bulls were put with crossbred cows in individual bull groups last year. Calves by these bulls have been weaned and their weaning performance together with the weaning and post-weaning performance of the first year's calf crop are given in table 4. This year (the third year of breeding) one Angus and one Simmental (7/8) bull were put with crossbred cows in individual bull groups. One Polled Hereford bull was put with crossbred heifers sired by Angus and Simmental bulls from the first year's breeding. Palpation last fall indicated 21 of 22 crossbred heifers were pregnant for a 95% pregnancy rate.

V. FUTURE PLANS:

At Reidsville, the post-weaning performance of steer calves by straightbred and crossbred bulls out of Polled Hereford dams will be obtained. Additional procedures at Reidsbille and Plains will be according to project outline. At Tifton, studies will be continued on Angus, Polled Herefords and Simmentals.

VI. PUBLICATIONS DURING THE YEAR:

Neville, W.E., Jr., J.B. Smith and W.C. McCormick. 1979. Reproductive performance of two- and three-year-old bulls assigned to twenty-five or forty cows during the breeding period. J. Anim. Sci. 48:1020.

Table 1

POSTWEANING PERFORMANCE OF 1978 BULL CALVES

Breed	Sire	No. of bulls	140-day ADG, lb	Final age, days	Final wt, lb	WPDA, lb
Angus	473	13	2.91	402	1045	2.60
Angus	619	6	3.17	408	1060	2.60
PH	470	7	3.39	386	990	2.56
PH	541	8	3.37	395	977	2.48
PH	637	4	3.32	379	951	2.51
PH	727	10	3.24	393	1000	2.54
Sim	MD	8	3.13	384	1108	2.88

Item	Conventional feedlot	Slotted floor	Control	Control + rumensin	Control limited fed
Bulls, no	24	24	16	16	16
ADG, 140 days, lb	3.02	2.99	3.15	3.00	2.87
Feed/lg gain	6.85	6.66	7.22	6.36	6.66

Table 2

POSTWEANING PERFORMANCE OF 1978 HEIFER CALVES

Item	Heifers fed in feedlot			
	Conventional feedlot	Slotted floor	Control	Control + rumensin
Heifers, no	16	16	16	16
ADG, 126 days	2.33	2.21	2.24	2.30
Feed/lb gain	7.50	7.25	8.20	6.57

Breed	Replacement heifers				
	No. heifers	176-day ADG, lb	Final age, days	Final wt, lb	WPDA, lb
Angus	13	1.04	413	726	1.76
PH	16	1.07	404	691	1.71
Sim	7	.88	398	706	1.78

Table 3

POSTWEANING PERFORMANCE ON PASTURE OF 1978 ANGUS, S. GERTRUDIS AND RECIPROCAL-CROSS BULLS AT REIDSVILLE

Breed	No. bulls	140-day ADG	Final age, days	Final wt, lb	WPDA lb
Angus (A)	6	2.39	420	747	1.78
S. Gertrudis (SG)	7	2.57	381	796	2.09
A x AG	8	2.48	409	826	2.03
SG x A	5	2.51	395	778	1.98

Table 4

GA 6
45

PERFORMANCE OF ANGUS AND SIMMENTAL CROSSBRED CALVES AT PLAINS

1978 Calf crop

		Pre-weaning				Post-weaning				
Breed	Sire	No.	Birth wt. lb	ADG birth to 9-27-78	205-day wt., lb	No.	ADG 9-27-78 to 4-2-79	Age days	Wt. lb	W/DA
					Heifers					
Angus	406	8	75.0	1.93	471	8	.49	454	681	1.50
	617	3	78.0	1.67	420	3	.38	455	595	1.31
	Avg.		75.8	1.86	457		.46	454	658	1.45
Sim(3/4)	620	6	84.0	1.97	487	6	.28	428	608	1.42
	623	6	89.7	2.00	500	5	.23	441	657	1.49
	Avg.		86.9	1.99	493		.25	435	630	1.45
Sim-Angus			11.1	.13	36		-.21 ADG (-.39 lb)	-20 days	-28 lbs	0
					Steers					
Angus	406	5	90.8	2.31	565					
	617	6	87.0	2.15	529					
	Avg.		88.7	2.22	545					
Sim(3/4)	620	9	92.7	2.10	523					
	623	4	96.0	2.14	535					
	Avg.		93.7	2.11	527					
Sim-Angus			5.0	-.11	-18					

1979 Calf crop

		Pre-weaning			
Breed	Sire	No.	Birth wt. lb	ADG birth to 8-29-79	205-day wt., lb
			Heifers		
Angus	737	8	75.5	2.09	505
	417	5	72.8	2.05	493
	Avg.		74.5	2.08	500
Sim(7/8)	713	5	77.8	2.10	508
	710	5	76.4	2.11	510
	Avg.		77.3	2.10	509
Sim-Angus			2.8	.02	9
			Steers		
Angus	737	7	71.4	2.20	523
	417	6	74.7	2.04	494
	Avg.		72.9	2.13	509
Sim(7/8)	713	7	93.3	2.36	576
	710	7	79.7	2.25	541
	Avg.		86.5	2.30	559
Sim-Angus			13.6	.17	50

Production, Inventory and Performance Data, S-10 Herds - 1979

State Georgia

Location		Tifton	Tifton	Tifton		
Breed of sire		P. Hereford	Angus	Simmental		
Breed of dam		P. Hereford	Angus	S x PH		
Line or group[1]		Purebred	Purebred	Sim x		
Percent used in project		60	60	60		
Inventory as of December 31, 1979	Cows 2 years and over	64	42	17		
	Yearling heifers	16	13	5		
	Bulls and steers under 1 year	26	26	7		
	Heifers under 1 year	19	11	9		
	Bulls over 1 year	5	1	1		
	Steers over 1 year	0	0	0		
Repro. perf.	Percent pregnant[2]	94	97	93		
	Calf survival percent[3]	94	96	88		
Wean. perf.	Adj. ADG[4]	457	529	540		
	Ave. type sc.[5]					
Postweaning performance	No. of bulls	26	26	7		
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:
205-day wt adj. for age of dam and sex (steer basis).

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Georgia

Location		Reidsville	Reidsville	Reidsville	Reidsville	Reidsville
Breed of sire		Angus	Santa Gert	Angus x SG SG x Angus	Angus	Santa Gert
Breed of dam		Hereford	Hereford	Hereford	Angus and Santa Gert	Santa Gert and Angus
Line or group[1]		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	99	75	98	58	55
	Yearling heifers	32	32	32	20	18
	Bulls and steers under 1 year	9	6	10		
	Heifers under 1 year					
	Bulls over 1 year				4	4
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	85	84	85	91	95
	Calf survival percent[3]	94	94	95	96	94
Wean. perf.	Adj. ADG[4]	396	434	418	389*	405*
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: 205-day wt adj. for age of dam and sex (steer basis).
*205-day wt adj. for breed of dam only.

[5]Suggest S-10 scoring system; indicate if different.

Funds Expended on Beef Cattle Breeding Work in S-10 Herds
During the Year Ending December 31, 1979

State Georgia

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds		44,630
USDA funds from ARS		
State-controlled funds[1]		20,500

[1]Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1979 (include total sales, whether spent on the project or not).

$110,319

Regional Research Fund Allotment for year 1979-80

49,034

UNIVERSITY OF KENTUCKY
Agricultural Experiment Station
Lexington, Kentucky

I. PROJECT: Animal Science 310 (S-10)

Estimation of genetic parameters for various preweaning and postweaning beef cattle traits.

II. OBJECTIVES:

To estimate magnitude of genetic parameters for various preweaning and postweaning beef cattle traits when the estimates are obtained from two populations where the criteria of selection is different for each population.

III. PERSONNEL:

F.A. Thrift and D.K. Aaron

IV. ACCOMPLISHMENTS DURING THE YEAR:

Preweaning records on 2864 calves from the Kentucky, North Carolina and Tennessee Stations were utilized to estimate heritabilities of birth weight, weaning weight, postweaning rate of gain and yearling weight. Each Station maintained a select line as well as a genetic control line and heritability values were calculated separately for each sex and line of calf combination by combining data from the three stations. Heritability values for each trait by sex and line of calf are presented in Table 1. For males and females, heritability estimates based on data collected on the genetic control populations are larger than estimates based on data collected on the populations subjected to selection for each of the four traits; however, only the estimates for postweaning rate of gain of males appear to be significantly different from each other.

V. FUTURE PLANS:

Complete analysis of data.

VI. PUBLICATIONS DURING THE YEAR:

None.

VII. PUBLICATIONS PLANNED:

None.

Table 1

HERITABILITY ESTIMATES BY SEX AND LINE OF CALF

Trait[a]	Males		Females	
	Select	Control	Select	Control
BW	.188 ± .093	.335 ± .178	.392 ± .122	.434 ± .203
WW	.274 ± .114	.388 ± .206	.156 ± .109	.392 ± .222
PG	.131 ± .111	.921 ± .249**	.375 ± .133	.875 ± .265
YW	.318 ± .127	.965 ± .251	.193 ± .117	.676 ± .258

[a]BW = birth weight, WW = weaning weight, PG = postweaning rate of gain and YW = yearling weight.

**P <.01.

Funds Expended on Beef Cattle Breeding Work in S-10 Herds
During the Year Ending December 31, 1979

State Kentucky

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds		$16,600
USDA funds from ARS		
State-controlled funds[1]		

[1]Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 19 (include total sales, whether spent on the project or not).

Regional Research Fund Allotment for year 1979

$16,600

LOUISIANA STATE UNIVERSITY
Agricultural Experiment Station
Baton Rouge, Louisiana

I. PROJECT: Hatch 605 (Revised)

General Title: Breeding methods for beef cattle in the Southern region.

Specific Title: Evaluation of systematic rotational crossbreeding plans for producing beef cattle in the Gulf Coast region.

II. OBJECTIVES:

To evaluate the productivity, usefulness, practicality and management of systematic rotational crossbreeding systems using the Angus, Brahman, Charolais and Hereford breeds.

To estimate for these breeds genetic parameters of biological and economic traits.

To determine the degree of heterotic advantage maintained in subsequent generations of rotational crossbreeding.

To determine the relative productivity of various types of crossbred cows.

III. PERSONNEL:

Donald E. Franke, Thomas D. Bidner, F. Glen Hembry and Ted O. McRae

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Scope and nature of work:

The calendar year 1979 was a transition year from Phase II to Phase III of Project 605. Steers born in 1978 and the last calf crop of Phase II were slaughtered and carcass data collected. Heifers born in 1975, 1976, 1977 and 1978 were exposed to bulls to produce calves in 1980, the first calf crop year for Phase III.

B. Research results:

The number of females exposed in 1979 to drop calves in 1980 and the pregnancy rate, based on rectal palpation, is given in table 1. Low conception rates in lines 2, 5, 6 and 7 are partially due to Brahman sired yearling heifers not having reached puberty during the breeding season.

Least squares means and linear contrasts for reproductive traits in Phase II by system of breeding are shown in table 2. Three-breed roation females had higher calving rates and weaning rates and their calves were born earlier in the calving season. Two- and four-breed

rotation cows weaned a similar proportion of calves. Brahman sired two-breed rotation calves were born later in the calving season. Heterosis estimates for reproductive traits by line of breeding are presented in table 3. These estimates indicate more hybrid vigor was expressed in three-breed rotation matings for calving rate, weaning rate and birth date than two- or four-breed rotational matings.

Least squares means and linear contrast for preweaning traits by system of mating are presented in table 4. Brahman sired two-breed rotation and Charolais sired four-breed rotation calves were heavier at birth. Average daily gains for three- and four-breed rotation calves were similar and greater than that of other calves. Adjusted weaning weights of all rotation bred calves were similar. Heterosis estimates (table 5) indicate variable amounts of hybrid vigor among systems and breed combinations within system, however estimates for preweaning ADG and actual weaning weight appear larger for three-breed rotation calves than others.

Least squares means for steer carcass traits by line and post-weaning management are given in table 6. Feedlot average daily gain for steers grazed on ryegrass pastures for 200 days postweaning and fed 70 days in the feedlot (PM=2) was greater than for steers fed 200 days postweaning (PM=1). Carcass quality grades, fat thickness measurements and yield grades indicate steers fed in the feedlot for 200 days were fatter at slaughter. The line x postweaning management source of variation was non significant indicating that steer lines performed similarily across postweaning management systems.

V. FUTURE PLANS:

Evaluation of current postweaning management systems with regard to Louisiana beef production practices will be carried out in 1980. A decision will be made to continue the program as outlined or to change the system. Other parts of the project will continue as planned.

VI. PUBLICATIONS:

Babcock, D.S. and D.E. Franke. 1979. Predicting producing ability in beef cows. La. Livestock Producers' Day Research Reports 19:51.

Babcock, D.S. and D.E. Franke. 1979. Heterosis for producing ability. La. Livestock Producers' Day Research Reports 19:54.

Brown, D.R. and D.E. Franke. 1979. Changes in postweaning traits of beef steers. La. Livestock Producers' Day Research Reports 19:58.

Harris, R.J. and D.E. Franke. 1979. Breed and season effects on post-weaning growth of beef heifers. La. Livestock Producers' Day Research Reports 19:66.

Dixon, J.M., C.L. Seger, D.E. Franke, J.W. Knox, H.V. Cox and W. Trahan. 1979. Progress Report 1979-Adult vaccination with strain 19 vaccine for the control of Brucellosis in affected herds. La. Livestock Producers' Day Research Reports 19:176.

Babcock, D.S. and D.E. Franke. 1979. Probable producing ability of straightbred and crossbred beef cows. J. Anim. Sci. 48 (Suppl. 1):1 (Abstr.).

Brown, D.R. and D.E. Franke. 1979. Postweaning feed intake and weight changes in beef steers. J. Anim. Sci. 48:(Suppl.):3 (Abstr.).

Harris, R.J. and D.E. Franke. 1979. Carcass traits of Brahman crossbred steers. J. Anim. Sci. 48 (Suppl.):3 (Abstr.).

Franke, D.E. 1979. Breed and heterosis effects of Zebu cattle. J. Anim. Sci. (Accepted for publication).

Franke, D.E. 1979. Brahman-British rotational crossbreeding. Reproduction in the third generation. J. Anim. Sci. 49 (Suppl.):156 (Abstr.).

Franke, D.E. 1979. Brahman-British rotational crossbreeding. Preweaning traits in the third generation. J. Anim. Sci. 49 (Suppl.1): 157 (Abstr.).

Table 1

NUMBER OF FEMALES EXPOSED TO BULLS IN 1979
TO DROP CALVES IN 1980 AND THEIR PREGNANCY RATES

Line	Cow breed type	Sire breed	Number	Pregnancy rate
1	Angus (A)	A	34	82.3
2	Brahman (B)	B	34	64.7
3	Charolais (C)	C	30	83.3
4	Hereford (H)	H	36	86.1
5	B_5A_3	A	28	85.7
6	B_5C_3	C	37	75.6
7	B_5H_3	H	37	81.0
8	$A_5C_2B_1$	B	36	88.8
9	$H_5A_2B_1$	B	35	88.5
10	$H_5C_2B_1$	B	33	78.8
11	$C_4H_2A_1B_1$	B	34	94.1
Overall			374	82.6

Table 2

LEAST SQUARES MEANS AND LINEAR CONTRAST FOR SYSTEMS OF MATING FOR REPRODUCTIVE TRAITS
PHASE II

System of mating	Calving rate	Calf survival	Weaning rate	Julian birth date
Straightbred (SB)	67.5	82.9	55.6	49.6
Two-breed rotation (TBR)	76.2	86.1	64.8	56.1
Three-breed rotation (THBR)	88.3	89.5	78.7	44.4
Four-breed rotation (FBR)	70.4	90.6	64.4	49.6
SB vs CB[1]	**	**	**	--
TBR vs THBR	**	--	**	**
TBR vs FBR	**	--	--	**
THBR vs FBR	**	--	**	*

[1]All crossbreds.

* (P<.05)

** (P<.01)

Table 3

HETEROSIS ESTIMATES FOR REPRODUCTIVE TRAITS BY LINE, PHASE II

Line	CR	CS	WR	JBD
A_3B_1	3.0[a](4.5)[b]	3.3 (3.7)	4.2 (7.4)	6.2 (12.8)
C_3B_1	9.4 (13.3)	-.01 (-1.1)	6.9 (12.1)	5.6 (10.9)
H_3B_1	13.7 (21.1)	6.3 (7.3)	16.5 (31.2)	7.5 (15.0)
$C_2A_1B_1$	16.4 (23.6)	8.8 (10.3)	21.1 (37.0)	-4.6 (-9.3)
$A_2H_1B_1$	23.3 (35.1)	1.9 (2.1)	21.4 (38.4)	-3.1 (-6.5)
$C_2H_1B_1$	20.8 (30.3)	8.4 (9.9)	25.3 (45.4)	-8.2 (-16.3)
$H_2A_1B_1$	4.8 (7.3)	7.1 (8.2)	10.2 (18.8)	.2 (.4)

[a]Expressed as a deviation of crossbred from weighted purebred average.
[b]Expressed as a percent of weighted purebred average.

Table 4

LEAST SQUARES MEANS AND LINEAR CONTRAST FOR PREWEANING TRAITS IN PHASE II

System of mating	Birth weight, kg	Preweaning ADG, kg	Actual wng. wt.,kg	205-day wng. wt., kg	Calf wt./ cow wt. ratio	Calf condition
Straightbred (SB)	31.7	.735	198.0	182.3	.412	10.5
Two-breed rotation (TBR)	35.4	.825	217.5	204.4	.445	10.8
Three-breed rotation (THBR)	30.9	.848	227.6	204.4	.423	11.6
Four-breed rotation (FBR)	36.4	.848	230.3	201.5	.456	11.2
SB vs CB[1]	**	**	**	**	**	**
TBR vs THBR	**	*	**	NS	**	**
TBR vs FBR	*	*	**	*	NS	**
THBR vs FBR	**	NS	NS	*	**	**

[1]Crossbreds

* ($P<.05$)

** ($P<.01$)

Table 5

HETEROSIS ESTIMATES FOR PREWEANING TRAITS BY LINE

Line	BWT	ADG	WWT	AWWT	EWWT	Condition
B_5A_3	5.5[a](19.4)[b]	.100 (13.7)	31.3 (16.7)	25.9 (14.7)	.054 (12.6)	.81 (7.8)
B_5C_3	4.5 (13.7)	.085 (10.7)	22.8 (11.1)	21.9 (11.3)	-.009 (-2.0)	.48 (4.7)
B_5H_3	5.2 (17.6)	.078 (11.2)	23.0 (12.7)	21.2 (12.3)	.006 (1.4)	.66 (6.5)
$A_5C_2B_1$	-1.6 (-5.3)	.116 (15.4)	26.9 (13.3)	22.0 (11.9)	.005 (1.2)	.65 (6.0)
$H_5A_2B_1$	1.2 (4.2)	.163 (24.8)	40.2 (22.2)	34.8 (21.12)	.049 (12.7)	1.22 (11.6)
$H_5C_2B_1$	- .2 (- .5)	.153 (21.8)	39.4 (20.4)	31.1 (17.7)	.019 (4.8)	1.24 (11.9)
$C_4H_2A_1B_1$	1.8 (5.1)	.076 (9.8)	19.2 (9.1)	17.4 (9.0)	.041 (9.8)	.66 (6.2

[a]Expressed as a deviation of crossbred from weighted purebred average.

[b]Expressed as a percent of weighted purebred average.

Table 6

LEAST SQUARES MEANS FOR CARCASS TRAITS OF STEERS FED POSTWEANING IN FEEDLOT FOR 200 DAYS (PM = 1) AND FOR STEERS WHICH GRAZED RYEGRASS FOR 200 DAYS POSTWEANING AND WERE IN FEEDLOT FOR 70 DAYS (PM = 2)

Line	Slaughter weight, kg		Feedlot ADG, kg		Hot carcass wt., kg		Carcass quality grade	
	PM1	PM2	PM1	PM2	PM1	PM2	PM1	PM2
1	428	429	1.15	1.22	261	244	12.1	10.3
2	355	391	.82	1.17	211	221	7.8	8.0
3	516	531	1.32	1.56	320	308	9.9	8.2
4	402	426	1.09	1.36	239	236	10.5	9.6
5	453	489	1.09	1.55	281	279	10.2	8.4
6	470	499	1.11	1.19	288	289	9.9	7.8
7	430	445	1.05	1.29	265	256	9.5	7.9
8	469	493	1.16	1.42	286	285	11.2	10.1
9	459	478	1.14	1.39	281	273	10.8	9.3
10	465	500	1.15	1.37	286	289	10.9	9.3
11	502	507	1.28	1.33	306	291	9.9	8.7

Line	Carcass wt/day of age, kg		Fat thickness,cm		Yield grade		Rib eye area,cm^2		Warner Bratzer Shear,kg	
	PM1	PM2	PM1	PM2	PM1	PM2	PM1	PM2	PM1	PM2
1	.605	.484	1.23	.77	2.9	2.1	72.9	72.5	9.5	10.6
2	.517	.456	.47	.50	1.9	1.9	63.5	63.9	12.5	15.1
3	.741	.606	.62	.47	1.9	1.2	92.9	94.6	9.3	11.0
4	.547	.460	1.04	.90	2.8	2.3	64.6	69.9	9.2	12.1
5	.659	.563	.91	.84	2.9	2.5	69.3	72.1	10.2	10.9
6	.682	.583	.87	.67	2.6	2.2	74.6	75.6	10.0	12.1
7	.632	.516	.87	.64	2.6	2.0	69.6	71.9	11.0	13.1
8	.672	.561	1.07	.90	2.8	2.4	75.8	78.3	9.4	10.1
9	.650	.538	1.23	.90	3.0	2.2	73.6	77.6	10.3	11.8
10	.656	.563	1.10	.91	2.9	2.4	75.8	76.1	9.2	10.6
11	.709	.569	.88	.62	2.2	1.7	76.8	85.2	9.5	11.1

Production, Inventory and Performance Data, S-10 Herds - 1979

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		A	B	C	H	A
Breed of dam		A	B	C	H	B_5A_3
Line or group[1]		1	2	3	4	5
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	28	27	22	34	21
	Yearling heifers	6	7	7	2	7
	~~Bulls~~ and steers under 1 year	3	2	0	1	1
	Heifers under 1 year	3	0	1	4	6
	Bulls over 1 year	2	7	2	3	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	77.7	12.5	20.0	55.5	88.8
	Calf survival percent[3]	87.5	100	100	100	87.5
Wean. perf.	Adj. ADG[4] (no) g	(6) 730	(1) 880	(1) 771	(5) 629	(7) 860
	Ave. type sc.[5]	11	10	9	10	11
Postweaning performance	No. of bulls	0	0	0	0	0
	No. of heifers	6	7	7	2	7
	No. of steers	8	1	4	8	6
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	Born in 1978 No. of steers	8	1	4	8	6
Remarks	Reproductive and weaning performance data from matings of and calves from females born in 1975, only.					

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		C	H	B	B	B
Breed of dam		B_5C_3	B_5H_3	$A_5C_2B_1$	$H_5A_2B_1$	$H_5C_2B_1$
Line or group[1]		6	7	8	9	10
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	29	31	30	29	23
	Yearling heifers	9	6	6	6	10
	~~Bulls~~ steers under 1 year	1	3	3	5	4
	Heifers under 1 year	6	3	7	4	4
	Bulls over 1 year	0	0	0	0	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	80.0	53.8	84.6	81.8	60.0
	Calf survival percent[3]	100	100	90.9	100	90.0
Wean. perf.	Adj. ADG[4] (no)	(7)	(6)	(9)	(9)	(8)
	g	908	838	857	848	917
	Ave. type sc.[5]	10	11	11	11	10
Postweaning performance	No. of bulls	0	0	0	0	0
	No. (1978) of heifers	9	6	6	6	10
	No. (1978) of steers	2	9	9	11	7
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. (1978) of steers	2	9	9	11	7
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

LA 12
63

Production, Inventory and Performance Data, S-10 Herds - 1979

State Louisiana

Location		Baton Rouge				
Breed of sire		B				
Breed of dam		$C_4H_2A_1B_1$				
Line or group[1]		11				
Percent used in project		100				
Inventory as of December 31, 1979	Cows 2 years and over	25				
	Yearling heifers	9				
	~~XXXXXXXXX~~ steers under 1 year	2				
	Heifers under 1 year	1				
	Bulls over 1 year	0				
	Steers over 1 year	0				
Repro. perf.	Percent pregnant[2]	85.7				
	Calf survival percent[3]	71.4				
Wean. perf.	Adj. ADG[4] (no) g	(1) 920				
	Ave. type sc.[5]	9				
Postweaning performance	No. of bulls	0				
	No. of heifers	9				
	No. of steers	6				
Slaughtered	No. of bulls	0				
	No. of heifers	0				
	Born in 1978 No. of steers	6				

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

NORTH CAROLINA STATE UNIVERSITY
Agricultural Experiment Station
Raleigh, North Carolina

I. PROJECT: Animal Science 1010

Breeding methods for beef cattle in the Southern Region.

II. OBJECTIVES:

1. To estimate genetic parameters associated with rates of growth and maturing and other characters of biological and economic importance.

   (a) To measure the effectiveness of selection to increase 205-day weight and postweaning gain to 365 days and to evaluate correlated responses in other traits.

   (b) To investigate phenotypic and genetic relationships between growth and milk production.

   (c) To investigate phenotypic and genetic relationships between growth and measures of reproductive fitness.

III. PERSONNEL:

O.W. Robison, E.U. Dillard and T.N. Blumer

IV. ACCOMPLISHMENTS DURING THE YEAR:

Data from purebred and crossbred cattle involving Angus, Charolais and Hereford breeds were used to estimate breed additive, heterotic, breed maternal and average maternal heterosis effects for birth weight, preweaning average daily gain (ADG), weaning weight and type score. Charolais additive effects, expressed as deviation from Hereford, were positive ($P<.05$) for birth weight, ADG and weaning weight. Angus additive effects were negative for birth weight ($P<.01$). Charolais maternal effects exceeded those for Hereford and Angus for all traits. Angus maternal effects significantly exceeded Hereford for all weight traits. Direct heterosis effects were significant for all traits except birth weight. These estimates were 2.4, 3.8, 3.9 and 3.7% for birth weight, ADG, weaning weight and type score, respectively. Average maternal heterosis was significant for ADG and weaning weight. A model that accounted for all of the differences among the breed groups only accounted for about 1% additional variance. Thus, it appears that breed additive, direct heterosis, breed maternal and average maternal heterosis adequately explains the variation among breed groups in these data.

Records on 490 Hereford heifers were used to evaluate the effects of age and weight on reproductive performance. Calving rate increased at a decreasing rate as heifers were older (303 to 438 days) at start of the breeding season. Of the body weights analyzed, yearling weight had the largest impact on calving rate. Only 19% of the variation in calving rate was accounted for by the 11 age and weight variables in the model.

Heavier yearlings had a lower proportion of dead calves (P<.01) in the first calving while heavier weaning weights resulted in a higher mortality (P<.01). Heavier calves had a higher death rate (P<.01). The full model, containing 18 variables, accounted for 25% of the variation in perinatal survival. Number of services per conception was not effected (P>.05) by any of the weight or age variables.

Heritability estimates were obtained from paternal half sibs by analysis of variance (ANOVA) and chi-square (X^2). Estimates for binary variables were corrected to a normal basis (ANOVA-C and X^2-C). For calving rate at 2 years of age these estimates were: .00±.10 (ANOVA), .13±.09 (X^2) and .22±.12 (X^2-C). When the heifers that failed to calve at either 2 or 3 years of age were excluded from the data, estimated heritabilities for calving rate were: .25±.15 (ANOVA), .54±.21 (ANOVA-C), .22±.14 (X^2) and .48±.20 (X^2-C). The heritability of barrenness (not calving at either 2 or 3 years of age) was estimated to be: .00±.04 (ANOVA), .16±.10 (X^2) and .33±.15 (X^2-C). Analyses of perinatal mortality yielded heritability estimates of .64±.21 (ANOVA), 1.25±.35 (ANOVA-C), .61±.25 (X^2) and 1.19±.34 (X^2-C). Heritability of services per conception was estimated at .35±.22.

V. FUTURE PLANS:

The project will be continued according to plan. No changes are anticipated for this year. Continued preparation of material for publication is planned.

VI. PUBLICATIONS:

Milagres, J.C., E.U. Dillard and O.W. Robison. 1979. Influences of age and early growth on reproductive performance of yearling Hereford heifers. J. Anim. Sci. 48:1089.

Milagres, J.C., E.U. Dillard and O.W. Robison. 1979. Heritability estimates for some measures of reproduction in Hereford heifers. J. Anim. Sci. 49:668.

Dillard, E.U., Oswaldo Rodriguez and O.W. Robison. 1980. Estimates of additive and nonadditive direct and maternal genetic effects from crossbreeding beef cattle. J. Anim. Sci. (Submitted).

VII. COOPERATING AGENCIES:

N.C. Department of Agriculture

Production, Inventory and Performance Data, S-10 Herds - 1979

State North Carolina

Location		Raleigh	Raleigh	Raleigh		
Breed of sire		H	H	H		
Breed of dam		H	H	H		
Line or group[1]		1	2	3		
Percent used in project		100	100	100		
Inventory as of December 31, 1979	Cows 2 years and over	32	42	20		
	Yearling heifers	13	14	4		
	Bulls and steers under 1 year	14	19	9		
	Heifers under 1 year	16	14	8		
	Bulls over 1 year	6	6	6		
	Steers over 1 year	--	--	--		
Repro. perf.	Percent pregnant[2]	80	90	82		
	Calf survival percent[3]	91	94	94		
Wean. perf.	Adj. ADG[4]	1.31	1.45	1.26		
	Ave. type sc.[5]	10.1	11.1	9.9		
Postweaning performance	No. of bulls	13	15	4		
	No. of heifers	16	16	5		
	No. of steers	--	--	--		
Slaughtered	No. of bulls	10	15	2		
	No. of heifers	--	--	--		
	No. of steers	--	--	--		
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

NC 4
67

Production, Inventory and Performance Data, S-10 Herds - 1979

State North Carolina

Location		Plymouth	Plymouth	Plymouth		
Breed of sire		H	H	H		
Breed of dam		H	H	H		
Line or group[1]		1	2	3		
Percent used in project		100	100	100		
Inventory as of December 31, 19 79	Cows 2 years and over	31	50	15		
	Yearling heifers	13	16	6		
	Bulls and steers under 1 year	17	28	6		
	Heifers under 1 year	13	23	12		
	Bulls over 1 year	--	--	--		
	Steers over 1 year	--	--	--		
Repro. perf.	Percent pregnant[2]	83	83	78		
	Calf survival percent[3]	86	88	90		
Wean. perf.	Adj. ADG[4]	1.41	1.47	1.46		
	Ave. type sc.[5]	10.6	10.8	11.1		
Postweaning performance	No. of bulls	13	27	9		
	No. of heifers	15	20	7		
	No. of steers	--	--	--		
Slaughtered	No. of bulls	10	21	5		
	No. of heifers	--	--	--		
	No. of steers	--	--	--		

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

CLEMSON UNIVERSITY
Agricultural Experiment Station
Clemson, South Carolina

I. PROJECT: SC00102

Genotypic and Phenotypic response of crossbred cattle under different levels of management.

II. OBJECTIVES:

To evaluate the reproductive and lifetime performance of crossbred females under different environmental condition.

To develop genotype: environmental systems for optimum beef production in the Southeastern United States.

III. PERSONNEL:

C.E. Thompsonm J.R. Hill, Jr., S.G. Woods, G.C. Skelley, L.R. Allen, D.L. Cross and J.W. Hubbard.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Replicate I: (Edisto Experiment Station)

Replicate I of the project involved five groups of 4-year-old cows of straightbred Angus, Polled Hereford-Angus, Charolais-Angus, Holstein-Angus and Simmental-Angus breeding. Of these cows, approximately one-half were on a moderate (Mod) level of nutrition and the other one-half level of nutrition. (The major difference in the two levels was the high group had access to Yuchi Arrowleaf Clover-Caostal Bermuda during the breeding season).

For the third consecutive year, two groups responded quite differently to the level of nutrition. All of the dams had produced calves sired by Angus bulls and were exposed to F_1 Simmental-Angus bulls for 75 days. Generally, the calves by cows on the high level were heavier and weaning and conception rate was higher for four out of the five genotypes of cows on the high level. As the cows produced their third calves from the Angus sires, very little calving difficulty was observed in either group.

Replicate II: (Simpson Experiment Station)

Two groups of Charolais-Angus, Polled Hereford-Angus and Simmental-Angus three-year-old cows were allotted to moderate or high treatment levels. Both levels were wintered to gain at a similar rate. Tillman Ladino Clover was the main clover in the fescue-clover grazing. Pregnancy rates on the clover-fescue pastures for the Simmental-Angus, Charolais-Angus and Polled Hereford-Angus were 65%, 58% and 65%, respectively. Pregnancy rates on the Moderate level were 69%, 85% and 65%, respectively. The Santa Gertrudis sired calves for the High level gained faster than those on the Moderate level and were heavier at weaning.

V. FUTURE PLANS:

The project will continue as outlined.

VI. PUBLICATIONS:

Thompson, C.E., J.R. Hill, Jr., L.R. Allen and L.W. Grimes. "Reproduction of Polled Hereford-Angus, Charolais-Angus and Simmental-Angus Two-Year-Old Dams". 1979. American Society of Animal Science Southern Section, Absract No. 4, New Orleans, Louisiana.

Thompson, C.E., Mario Deluca, G.L. Burns and J.R. Hill, Jr. "Birth Weight Differences in Calves from Angus Dams from 5 Sire Breeds". American Society of Animal Science, Abstract No. 68, Tucson, Arizona.

DeLuca, Mario. "Productive and Reproductive Performance of Young Beef Cows on Grass and Legume Hays", Masters Thesis, December 1979, Clemson University, Clemson, SC.

Production, Inventory and Performance Data, S-10 Herds - 1979

State South Carolina

Location		Edisto Experiment Station, Blackville, SC				
Breed of sire		Angus	Angus	Angus	Angus	Angus
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	Angus x Angus	Holstein x Angus
Line or group[1]		Moderate Level	Moderate Level	Moderate Level	Moderate Level	Moderate level
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	8	16	11	7	8
	Yearling heifers					
	Bulls and steers under 1 year	5	8	7	5	7
	Heifers under 1 year	3	8	4	2	1
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	82	84	53	63	67
	Calf survival percent[3]	100	100	100	100	100
Wean. perf.	Adj. ADG[4]	.86	.76	.89	.75	1.00
	Ave. type sc.[5]	11	10	11	10	12
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

SC 4
71

Production, Inventory and Performance Data, S-10 Herds - 1979

State South Carolina

Location		Edisto Experiment Station, Blackville, SC				
Breed of sire		Angus	Angus	Angus	Angus	Angus
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus	Angus x Angus	Holstein x Angus
Line or group[1]		High Level	High Level	High Level	High Level	High Level
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	10	11	7	11	9
	Yearling heifers					
	Bulls and steers under 1 year	4	8	1	5	4
	Heifers under 1 year	6	3	6	6	5
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	76	95	81	91	100
	Calf survival percent[3]	100	100	100	100	100
Wean. perf.	Adj. ADG[4]	.93	.95	.94	.87	1.03
	Ave. type sc.[5]	12	11	12	11	12
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

S-10-1 (Rev.)

Production, Inventory and Performance Data, S-10 Herds - 1979

State South Carolina

Location			Coast Experiment Station, Summerville, SC			
Breed of sire		Angus	Charolais	Hereford		
Breed of dam		Angus	Angus	Angus		
Line or group[1]						
Percent used in project		100	100	100		
Inventory as of December 31, 1979	Cows 2 years and over	11	23	51		
	Yearling heifers					
	Bulls and steers under 1 year	7	6	26		
	Heifers under 1 year	4	17	25		
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	84	84	84		
	Calf survival percent[3]	92	83	92		
Wean. perf.	Adj. ADG[4]	.80	.83	.84		
	Ave. type sc.[5]	11	12	12		
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

SC 6
73

Production, Inventory and Performance Data, S-10 Herds - 1979

State South Carolina

Location		Simpson Experiment Station, Pendleton, SC				
Breed of sire		Santa Gertrudis	Santa Gertrudis	Santa Gertrudis		
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus		
Line or group[1]		Moderate Level	Moderate Level	Moderate Level		
Percent used in project		100	100	100		
Inventory as of December 31, 1979	Cows 2 years and over	26	24	25		
	Yearling heifers					
	Bulls and steers under 1 year	12	8	10		
	Heifers under 1 year	5	7	7		
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	85	65	69		
	Calf survival percent[3]	100	77	79		
Wean. perf.	Adj. ADG[4]	.74	.61	.72		
	Ave. type sc.[5]	12	11	12		
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State South Carolina

Location		Simpson Experiment Station, Pendleton, SC				
Breed of sire		Santa Gertrudis	Santa Gertrudis	Santa Gertrudis		
Breed of dam		Charolais x Angus	Hereford x Angus	Simmental x Angus		
Line or group[1]		High Level	High Level	High Level		
Percent used in project		100	100	100		
Inventory as of December 31, 1979	Cows 2 years and over	25	24	24		
	Yearling heifers					
	Bulls and steers under 1 year	5	8	11		
	Heifers under 1 year	12	2	5		
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]	58	65	65		
	Calf survival percent[3]	84	94	82		
Wean. perf.	Adj. ADG[4]	.81	.78	.89		
	Ave. type sc.[5]	12	11	12		
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

SC 8
75

Funds Expended on Beef Cattle Breeding Work in S-10 Herds
During the Year Ending December 31, 1979

State South Carolina

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds	----------	$37,358.73
USDA funds from ARS	----------	---------
State-controlled funds[1]	----------	$226,506.95

[1]Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 1979 (include total sales, whether spent on the project or not).

$78,650

Regional Research Fund Allotment for year 1979

$49,004.23

UNIVERSITY OF TENNESSEE
Agricultural Experiment Station
Knoxville, Tennessee

I. PROJECT: H-481 (S-10)

Effects of selection to improve growth rate in beef cattle.

II. OBJECTIVES:

To measure the effectiveness of selection to improve growth rate to a year of age and the effects such selection will have on other traits.

To investigate phenotypic and genetic relationship between growth rate and other variables.

To investigate various methods of improving the accuracy of assessment of growth rate.

To study inbred beef cattle with the aid of immunogentic markers.

III. PERSONNEL:

R. R. Shrode, R. D. Freeland, D. D. Howard and W. T. Butts, Jr.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Eradication of brucellosis in the Angus herd has now been accomplished. Since the January, 1979 test, no reactors have been found in monthly tests. If no reactors are detected through March, 1980, the herd will be given a brucellosis-free certificate. Strict isolation and separation of pasture breeding groups throughout the subsequent calving season instead of mingling cows from throughout the herd in large groups for calving, as had been the practice in previous years, appears to have been the critical procedure which contributed to the success of the eradication program. Table 1 contains the numbers of reactors detected by month of test, and Table 2 contains the numbers of reactors detected by year of birth. These numbers tend to show the effectiveness of calfhood vaccination in that fewer reactors were detected among cows born during years in which calfhood vaccination was practiced than in years when it was not. The 16 orphaned daughters of reactors which were retained and bred have all dropped normal, full-term calves, and none of them have reacted to the brucellosis test, which indicates that prenatal infection from their infected dams did not occur. Of the total of 178 reactors detected, approximately 20% had been vaccinated as calves.

Analyses to assess the effect of sire of fetus carried by a cow on growth of her currently nursed calf indicate that this effect may be real, but the results are somewhat inconsistent. Table 3 contains rank correlations between variables of currently nursed calf and sire-of-fetus progeny average calculated from all progeny of the sire of fetus carried by the cow. Tables 4 and 5 contain the results of analyses of variance of traits of currently nursed calf using sire-of-fetus carried by the cow as the

independent variable. The analyses were performed after adjusting the date for age of dam, sex of calf, age of calf and sire of calf and again after adding birth weight of fetus, to determine if the sire-of-fetus effect indicated in the first analyses shown in Tables 4 and 5 might be largely due to differences in physical size of fetus. Though the exact nature of such a sire-of-fetus effect, if it is indeed real, is not known, it must involve an influence of fetal hormones on milk production of the cow. It is rather surprising that such an effect would persist following weaning of the calf. These preliminary results, though somewhat inconsistent and confusing, are certainly interesting enough to justify further study.

V. FUTURE PLANS:

Completion of analyses of body measurement data (still in progress) with emphasis on efforts to obtain meaningful estimates of genetic parameters.

Continuation of study of effect of sire of fetus carried by the cow on growth of currently nursed calf.

Study of blood types with respect to:

1. Fluctuation of frequencies of various types from calf crop to calf crop.

2. Any association of blood type with susceptibility to brucellosis.

3. Comparison of observed and expected heterozygosis for systems in which heterozygosis can be detected.

VI. PUBLICATIONS:

Dellmeier, G.R., R. R. Shrode and D. A. Shannon. 1979. Use of body measurements to select beef female replacements at weaning. Tennessee Farm and Home Science 111:33-34.

Turner, T. B. and R. R. Shrode. 1980. Sire effect and beef cow productivity. (Submitted to Journal of Animal Science).

Hammack, S. P. and R. R. Shrode. 1980. Calfhood weights, body measurements and estimates of body composition vs. criteria of overall size and shape for predicting yearling performance in beef cattle. (Submitted to Journal of Animal Science).

Table 1. Cows sold for slaughter due to reaction to brucellosis test. (By month)

Month	Number of Cows	Month	Number of Cows
November, 1976	22	January, 1978	6
December, 1976	16	February, 1978	4
January, 1977	17	March, 1978	8
March, 1977	18	April, 1978	4
April, 1977	13	May, 1978	6
May, 1977	26	July, 1978	10
July, 1977	17	August, 1978	1
September, 1977	3	November, 1978	1
November, 1977	3	January, 1979	2
December, 1977	1		
		Total -	178

Table 2. Cows sold for slaughter due to reaction to brucellosis test. (By cow birth year)

Cow Birth Year		Number of Reactors
1964	Calfhood vaccination practiced	1
1965	" " "	6
1966	" " "	2
1967	" " "	2
1968	" " "	7
1969	Calfhood vaccination discontinued	11
1970	" " "	24
1971	" " "	30
1972	" " "	25
1973	" " "	27
1974	" " "	26
1975	Calfhood vaccination practiced	13
1976	" " "	3
1977	" " "	1
	Total -	178

Table 3. Rank correlations between variables of currently nursed calf and average of all progeny of sire of fetus carried by the cow

Currently Nursed Calf		Average of Progeny of Sire of Fetus					
		Avg. Daily Gain (ADG)		Type Score (TYPE)		Condition Score (COND)	
		Angus	Polled H.	Angus	Polled H.	Angus	Polled H.
120 Days	ADG	.10*	.18**	.12*	.14**	.13**	.07
	TYPE	.07**	.02	.15*	-.01	.02	-.17**
	COND	-.12**	.12**	-.03	-.07**	.19**	.07
Weaning	ADG	.09**	.25**	.08**	-.26**	-.06**	.09**
	TYPE	.04*	-.21**	.26**	.41**	-.15**	-.06*
	COND	-.05**	-.03	-.18**	.10**	.24**	-.01
Yearling	ADG	.04	.07	.01	-.07	-.03	.04
	TYPE	.08**	.05	.15**	.05	-.02	-.01
	COND	-.08**	.15**	-.01	-.09*	-.14**	.11*

*P<.05

**P<.01

Table 4. Analyses of variance of traits of currently nursed calf using sire of fetus carried by the cow as the independent variable (Angus data)

	Dependent Variable	Effect	Standard Adjustments[a] D.F.	Standard Adjustments[a] M.S.	Standard Adjustments Plus Birth Weight of Fetus D.F.	Standard Adjustments Plus Birth Weight of Fetus M.S.
	ADG	Sire of fetus	164	.0352**	161	.0403**
		Error	2126	.0169	1964	.0173
Weaning	TYPE	Sire of fetus	164	.0284**	161	2.7433**
		Error	2183	.0005	1964	.0530
	COND	Sire of fetus	164	.0241**	161	2.3196**
		Error	2183	.0017	1964	.1718
	ADG	Sire of fetus	130	.0263	130	.0271
		Errir	1145	.0269	1145	.0272
Yearling	TYPE	Sire of fetus	130	.0092**	130	.9281**
		Error	1145	.0005	1145	.0533
	COND	Sire of fetus	130	.0098**	130	.9849**
		Error	1145	.0002	1145	.0242

[a]Standard adjustments included adjustment for age of dam, sex of calf, calf age and sire of calf

*P<.05

**P<.01

Table 5. Analyses of variance of traits of currently nursed calf using sire of fetus carried by the cow as the independent variable (Polled Hereford data)

	Dependent Variable	Effect	Standard Adjustments[a] D.F.	Standard Adjustments[a] M.S.	Standard Adjustments Plus Birth Weight of Fetus D.F.	Standard Adjustments Plus Birth Weight of Fetus M.S.
	ADG	Sire of fetus	82	.1455**	81	.1341**
		Error	946	.0304	870	.0290
Weaning	TYPE	Sire of fetus	82	.0593**	81	6.1792**
		Error	943	.0019	870	.1876
	COND	Sire of fetus	82	.0057**	81	.6203**
		Error	943	.0017	870	.1823
	ADG	Sire of fetus	60	.0570*	60	.0591*
		Error	511	.0408	511	.0415
Yearling	TYPE	Sire of fetus	60	.0086**	60	.8981**
		Error	511	.0012	511	.1250
	COND	Sire of fetus	60	.0092**	60	.9195**
		Error	511	.0010	511	.1140

[a]Standard adjustments included adjustment for age of dam, sex of calf, calf age and sire of calf.

*P<.05

**P<.01

Production, Inventory and Performance Data, S-10 Herds - 1979

State Tennessee

Location		PES	PES	PES	TES	TES
Breed of sire		Angus	Angus	Angus	P. Hereford	P. Hereford
Breed of dam		Angus	Angus	Angus	P. Hereford	P. Hereford
Line or group[1]		Inbred	Select	Control	Select	Control
Percent used in project		100%	100%	100%	100%	100%
Inventory as of December 31, 1979	Cows 2 years and over	48	56	39	51	50
	Yearling heifers	2	10	5	13	9
	Bulls and steers under 1 year	12	24	24	19	24
	Heifers under 1 year	7	30	17	27	26
	Bulls over 1 year	0	0	0	0	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	89.6	96.4	100.0	88.3	98.0
	Calf survival percent[3]	73.9	90	90	86.3	85.7
Wean. perf.	Adj. ADG[4]	2.04	2.10	2.02	1.65	1.63
	Ave. type sc.[5]	13.4	13.3	13.4	13.2	12.8
Postweaning performance	No. of bulls	11	23	12	21	19
	No. of heifers	12	15	11	26	20
	No. of steers	0	0	0	0	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	0

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

TEXAS AGRICULTURAL EXPERIMENT STATION
College Station, Texas

I. PROJECT: H-2101

"Breeding Methods For Beef Cattle in The Southern Region"

II. PERSONNEL:

T.C. Cartwright, C.R. Long, J.O. Sanders, J. Caldwell, D.F. Weseli and N.M. Kieffer

III. PURPOSE:

Project H-2101 presently serves a coordinating role for all Texas Agricultural Experiment Station Projects which contribute to Regional Project S-10. Specific accomplishments, results and plans are presented by specific contributing project.

TEXAS
AGRICULTURAL EXPERIMENT STATION
College Station, Texas

I. PROJECT: H-1936

Evaluation of hybrid systems for total efficiency of beef production.

II. OBJECTIVES:

1. Evaluation of hybrid vigor for traits of major economic value.

   a. Female traits (breeding cattle)
      (1) Growth and maintenance requirements evaluated under pasture and drylot conditions
      (2) Annual lifetime fertility, including age at puberty, services to conception and calving intervals
      (3) Incidence of dystocia
      (4) Productive longevity
      (5) Maternal ability, milk yield

   b. Male traits (slaughter cattle)
      (1) Rate and efficiency of growth prior to optimal slaughter weight
      (2) Survivability and vigor
      (3) Carcass merit

2. Comparison of breeds and crosses, including dairy breeds, for their potential as "dam lines" for beef production. Dam-line breeds and crosses among these breeds will be Angus, Brahman, Hereford, Holstein and Jersey.

3. Evaluation of loss of hybrid vigor associated with the decreased heterozygosity and recombination losses due to inter se matings of F_1 hybrids as practiced in new breed development.

4. Production of experimental cattle with the required degree of controlled genetic variability for efficacious auxiliary intensive investigations:

   a. Evaluation of growth curves for body composition using serial slaughter techniques
   b. Evaluation of partial efficiencies of growth, maintenance and lactation
   c. Development of management systems specifically applicable to optimal utilization of sire and dam line breeding programs; for example, nutritional programs to reduce dystocia and to promote early postparturient conception.

III. PERSONNEL

C.R. Long (leader) and T.C. Cartwright

IV. ACCOMPLISHMENTS DURING THE YEAR:

Knowledge of relationships among growth, puberty, reproduction and other characters of cattle is necessary for designing efficient beef production systems. Data on bulls (group and individually fed) and heifers (pastured and individually fed) of a diallel involving Angus, Brahman, Hereford, Holstein and Jersey (reciprocals pooled) showed that mature height was approached more rapidly than mature weight. Breedtype and management (pasture vs individual feeding) were found to significantly affect weight, height and condition score at most ages as well as growth rate. The breedtype x management interaction was significant for weight, weight-height ration and condition score of heifers at most ages. Heterosis was observed for weight (7 to 14%) and height (2 to 4%) in bulls and heifers. Management affected level of heterosis observed in heifers. Results suggest that heterosis in younger animals may be partially due to accelerated development potential in crossbreds; higher nutrition under individual feeding apparently provided the requirement for the expression of this potential in the heifers.

Breedtype differences were observed for age, weight and height at puberty of bulls and heifers; heterosis for weight and height at puberty was positive while differences between straightbreds and crossbreds for age at puberty ranged from -3.6 to +3.7% across sex-management categories.

Preliminary analyses of records of cows producing first and second inter se calves revealed average heterosis estimates for age at first parturition (-5.4%), postpartum interval (-4.6%), calving interval (-.5%), calves born alive (9.0%), calves weaned of calves born (11.3%), parturition weight (5.8%) and parturition height (2.4%). Crossbreds were younger at first parturition, exhibited shorter postpartum and calving intervals and produced calves with higher survival rates at birth and to weaning.

V. FUTURE PLANS:

Project H-1936 calf production will continue as outlined in the proposal. Data collection procedures will continue as described in earlier reports.

All first generation cows have produced three inter se calves and are being mated by natural service to Charolais and Red Poll sires. Second generation females continue to produce F_3 and straightbred calves; a few produced three inter se calves and are being mated to Charolais and Red Poll sires.

Data analyses which are scheduled for completion during the coming year include data on first and second generation cows in confinement as well as first generation calving and weaning data on the first 3 calves. Three-breed cross and third generation calves will be produced in increasing numbers and will be available to other researchers and locations for research.

Some reductions and alterations have been made in design and data collection to reduce costs of the project; however, the primary objectives remain intact.

IV. PUBLICATIONS DURING THE YEAR:

Long, C.R., T.S. Stewart, T.C. Cartwright and T.G. Jenkins. 1979. Characterization of cattle of a five breed diallel: I. Measures of size, condition and growth in bulls. J. Anim. Sci. 49:418-431.

Long, C.R., T.S. Stewart, T.C. Cartwright and J.F. Baker. 1979. Characterization of cattle of a five-breed diallel: II. Measures of size, condition and growth in heifers. J. Anim. Sci. 49:432-447.

Stewart, T.S., C.R. Long and T.C. Cartwright. 1980. Characterization of cattle of a five breed diallel: III. Puberty in bulls and heifers. J. Anim. Sci. (In Press).

Baker, J.F., C.R. Long and T.C. Cartwright. 1979. Effects of adjustment to constant age, weight or height on interpretation of slaughter and carcass characters. ASAS 1979 Meeting Abstracts: 152 (Abstr.).

Nelson, T.C., C.R. Long and T.C. Cartwright. 1979. Heterosis for size and maturing rate in cattle. ASAS 1979 Meeting Abstracts: 165 (Abstr.).

Nelsen, T.C. 1979. Heterosis for size and maturing rates in cattle. Ph.D. Dissertation. Texas A & M University, College Station.

Baker, J.F. 1979. Characterization of carcass traits of bulls in five cattle breeds and their diallel crosses. M.S. Thesis, Texas A & M University, College Station.

I. PROJECT: G-6230

Biological Efficiency and Economic Viability of Forage Based Beef Cattle Production Systems

II. PERSONNEL:

T.C. Cartwright, J.O. Sanders and C.R. Shumway

III. ACCOMPLISHMENTS DURING THE YEAR:

Simulations were conducted for beef cattle production systems in three locations: Welder Ranch (Gulf Coast), Overton (East Texas) and McGregor (Central Texas).

The Welder Ranch study is in collaboration with the Range Science Department which has collected several years of forage and animal productivity data from this cooperating ranch. This area of Texas may be characterized as humid semi-tropical with very low forage quality and production during the winter months. Santa Gertrudis cattle with mature weights of 500 kg and peak daily milk production of 11.5 kg, the type of cattle on the ranch, were simulated. Simulation results using present management practices of December-March calving, October weaning, three-year-old first calving and limited hay supplementation in January and February closely matched actual animal performance data. Alternative calving seasons, weaning ages and supplemental feeding progrmas were simulated and compared to baseline results. Management changes not requiring additional supplemental feeding were predicted to increase calves sold per 1000 cows by up to 28% and total weight sold per cow by up to 11%. With improved care of replacement females, 24-month first calving and increase supplemental feeding, calves sold per 1000 cows could be increased by up to 119% and total weight sold per cow by up to 75%. Preliminary results have been reproted (Kothmann and Smith, 1980); final publication will follow completion of economic analyses.

Forage and cattle parameters from the McGregor Research Center were used to evaluate the interaction between cattle of different size and milk production potentials and different management practices related to time, are and weight of sales.

Three different sizes of cattle representing large (550 kg), medium (500 kg) and small (450 kg) were simulated (size was characterized as the weight of an 8 year old cow in good condition). For each size, three levels of potential peak daily lactation potential (8, 11 and 14 kg) were simulated. The sizes and milk potentials were chosesn to include a wide range of beef cattle types that are, or could be, used in central Texas. Management choices included weaning all calves on a common date (November 1) or weaning calves born in February and March on October 1 and those born in April and May on December 1. (The February 1-May 30 calving season was common to all cow types.) The cow-calf simulations indicated heavier milking cows weaned fatter calves but at the expense of cow condition and herd fertility. An economic analysis is being prepared to estimate prices received for the calves of different frame sizes and degrees of fatness sold at different times of the year. These results, along with herd costs and salvage animal

prices are being combined to develop costs and return estimates for the various cow types used in cow-calf systems. Although the largest and lightest milking type of cow tended to be associated with higher returns, year-to-year variation in prices and costs far outweighed cow type in importance as a source of variation in producer returns. In general, there was little difference among cow types in net returns when the cows were managed similarily. Further simulations are being run on the calves produced as they grow out through complete pasture, complete feedlot or a combination pasture-feedlot system. The expected and estimated actual returns associated with the various degrees of vertical integration, when selected spot forecast and hedging strategies are used, are the subject of another current economic analysis. Both level and variance of returns under selected hedging strategies are of interest, especially as they relate to risks inherent in each system. All economic analyses are being run under historical price relationships between pasture, grain, harvested forages and the types of cattle. The effects on the relative value and risks involved in the management and cattle systems are to be examined as prices relationships vary.

Forage and cattle data from the Overton Research Center were utilized to simulate production from cultivated, highly fertilized pastures in the East Texas high rainfall area. Cattle simulated were considered to be Herefords averaging 480 kg at maturity for cows in good condition and producing 10 kg of milk at peak mature daily production. Linear programing components were added to the cattle model to account for acreage and to maximize profit. A major objective was to determine biological and economic effects of simultaneous changes in quality and quantity of forages, of different calving seasons, and of different cattle enterprises: 1. cow-calf, 2. (1) plus stockers, 3. (2) plus drylot finishing, 4. (2) plus forage finishing.

The results of both the long and short run linear programming models inidicate: (a) Given 1977 normal prices, the cow-calf enterprise is the most competitive among the cow-calf, stocker, drylot-finished, and forage-finished enterprises. (b) Relative to calf prices, increases of at least 10 and 20 percent in stocker and finished cattle prices, respectively, will make those livestock enterprises competitive in the long run. In the short run, their prices would have to be at least 20 and 30 percent higher, respectively, for them to be comptetitive. (c) The fall calving season is preferred for the cow-calf enterprise and spring calving for all others. (d) Common bermudagrass overseeded with crimson clover-ryegrass is the most profitable forage unless beef prices increase at least 40 percent, at which price Coastal bermudagrass replaces it. (e) Stressing winter feeding is not profitable at current price levels. (f) Increases in energy prices have little effect on beef supply on this farm in the short run. In the long run, however, energy prices 30 percent above 1977 levels would force this farm out of cattle production if all other prices remained constant.

IV. FUTURE PLANS:

Cattle production systems will be simulated for a number of locations (econzones) in Texas and the Southern Region. All research locations and private cooperating ranchers that have collected suitable forage and cattle data are possible locations for cooperative systems analysis studies. The

general objective of all studies will be to examine genotype x environment interactions and to formulate production systems with optimal management practices and cattle traits. Environment is considered to include management, nutrition and marketing practices. Locations currently being considered include Texas Experimental Ranch at Throckmorton, Uvalde Research and Extension Center and Auburn. Ideally all studies should include forage and animal scientists and economists in order to examine efficiency of each total production system as observed and with various alternative inputs or practices.

V. PUBLICATIONS DURING THE YEAR:

Sanders, J.O. and T.C. Cartwright. 1979. A general cattle production systems model. I. Structure of the model. Agricultural Systems 4:217-227.

Sanders, J.O. and T.C. Cartwright. 1979. A general cattle production systems model. II. Procedures used for simulating animal performance. Agricultural Systems 4:289-309.

Notter, David R., J.O. Sanders, G.E. Dickerson, Gerald M. Smith and T.C. Cartwright. 1979. Simulated efficiency of beef production for a midwestern cow-calf-feedlot management system. I. Milk production. J. Anim. Sci. 49:70-82.

Notter, David R., J.O. Sanders, G.E. Dickerson, Gerald M. Smith and T.C. Cartwright. 1979. Simulated efficiency of beef production for a midwestern cow-calf-feedlot management system II. Mature body size. J. Anim. Sci. 49:83-91.

Notter, David R., J.O. Sanders, G.E. Dickerson, Gerald M. Smith and T.C. Cartwright. 1979. Simulated efficiency of beef production for a midwestern cow-calf-feedlot management system. III. Cross-breeding systems. J. Anim. Sci. 49:92-102.

Cartwright, T.C. 1979. Size as a component of beef production efficiency: cow-calf production. J. Anim. Sci. 48:974-980.

Angirasa, A.K. 1979. Firm level beef supply: a simulation and linear programming application in East Texas. Ph.D. Dissertation, Texas A & M University, College Station.

Kothmann, M.M. and G.M. Smith. 1980. Evaluating management alternatives on a coastal prarie ranch by simulation. International Meeting, Soc. Range Mgt. (Abstr.).

Stokes, K.W. 1980. An economic evaluation of alternative production systems available to Texas beef cattle producers. Ph.D. Dissertation. Texas A & M University, College Station. (In preparation).

I. PROJECT: TEXO 6335

Immunogenetic analysis of the major histo-compatibility system in cattle.

II. OBJECTIVES:

1. Develop procedures to detect bovine lymphocyte antigens.
2. Determine the mode of inheritance of lymphocyte alloantigens.
3. Determine the relationship of specific lymphocyte antigens with the susceptibility or resistance to given diseases.
4. Determine the influence of histo-incompatibility on conception rate and embryonic mortality.

III. PERSONNEL:

Jerry Caldwell (Leader), D.F. Weseli, J.W. Templeton, J.D. Williams and L.G. Adams

IV. ACCOMPLISHMENTS DURING THE YEAR:

A total of 1266 antilymphocytic antisera have been collected from various breeds of cattle. Most of these have been screened for antibody activity and those determined useful were placed in the routine typing test. Population and family studies have revealed the existance of nine alleles at the BoLA A locus. These data were confirmed during the First American BoLA Workship hosted by this laboratory during 1979. Tentative evidence is also available for a linked locus (BoLA B). Studies are continuing to expand the list of known alleles at these serologically defined loci using T lymphocytes as the target cells. Research has also been initiated to determine the presence of immune response genes via testing for B lymphocyte antigens.

V. PUBLICATIONS DURING THE YEAR:

Caldwell, J. 1979. Polymorphism of the BoLA system. Tissue Antigens 13:219-326.

Caldwell, J., P.A. Cumberland, D.F. Weseli and J.D. Williams. 1979. Breed differences in frequency of BoLA specificities. Anim. Blood Grps biochem. Genet. 10:93-98.

VI. FUTURE PLANS:

Research will continue on collecting antisera and testing families of cattle to determine the inheritance of lumphocyte antigens. As the opportunity becomes available, animals which possess specific disease susceptibility or resistance will be studied with respect to lymphocyte antigen profile. Work is planned to further study teh MLR locus.

TEXAS AGRICULTURAL EXPERIMENT STATION
College Station, Texas

I. PROJECT: H-6268

II. PERSONNEL:

Nat M. Kieffer and Duane C. Kraemer

III. ACCOMPLISHMENTS DURING THE YEAR:

Areas of Investigation:

1. Genetic Mechanisms of Muscle Development in Cattle
2. Testosterone Induced Phenotypic Sex Reversal in Sheep
3. Genetic Potential of Domestic x Banteng Cattle in Commercial Beef Cattle Production

1. Genetic Mechanisms of Muscle Development in Cattle:

During the period covered by this report, 7 embryo transfers were made and 1-1/2 sets of twins were born. On 12-20-78 a normally muscled cow gave birth to a genotypically normal bull calf (biologically her own) and a double-muscled female (embryo transplant). A second cow, normally muscled, was bred by natural services on 5-23-78 and 8 days later a double-muscled embryo was non-surgically transferred to her. This cow calved a double-muscled bull calf on 3-5-79. Her own egg either was not fertilized, or if it was fertilized, it failed to develop. The maturation of a double-muscled fetus in a non-doubled muscled foster mother without interaction of a normally-muscled embryo has added a new dimension to this study. We have now redesigned the experiment to better evaluate genotype-environmental interactions between the cow and the fetus. The effects of prenatal environment on the expression of genes of the offspring has intrigued biologists for centuries. The re-design of this experiment should shed light on whether such prenatal influences occur, and if they do, how important they are to both prenatal and postnatal development of the calf. Information on the prenatal effects of the cow in the expression of the genotype of the calf will be very important to the continued growth of the embryo transplant industry. The one observation that we have made of a double-muscled calf born to a normal cow suggest that the genotype of the cow did not interact with the genotype of the calf so that the calf developed differently than would be expected of its own genotype.

A total of two complete sets of embryo transfer twins have been born since this study was initiated 18 months ago. Each set consists of a double-muscled and a non-double-muscled member and one set developed in a double-muscled cow whereas the other set was carried to term by a normal muscled cow. Further, one twin set consists of a double-muscled bull calf and a normally muscled heifer and the other set is made up of a double-muscled

heifer and a normally muscled bull calf. We have taken muscle biopsies from each member of each twin set in order to classify the muscles according to fiber types and the numbers of nerve fibers innervating the muscles. Since the muscles of double-muscled cattle have a higher ratio of white to red fibers and profuse branching of nerve axons, these criteria are useful in identifying double-muscled characteristics. Although the nerve and muscle parameters have not yet been determined, experienced observers of the physical characteristics of double-muscling believe that the normal calves have been induced by their double-muscled co-twins to develop a greater amount of muscling than is normal for genetically non-double-muscled cattle. This observation suggests that either a preformed biochemical capable of inducing muscle development or cells capable of producing a skeletal muscle inducer are being transferred from the double-muscled embryo to the normal embryo. The inference that the number of muscle fibers, and hence the size of the mature muscle is under control of a single gene is novel and if real, certainly enhanced the prospects for exerting some control over muscle development in domestic animals.

The ratio of successful twin embryo transplants to the number attempted has been hampered by poor reproductive efficiency of normally-muscled cows. These cows were purchased in Colorado by a local rancher and we obtained them from him. They have not cycled regularly and on several occasions, embryos could not be recovered from them. We have now made arrangements to obtain normal embryos from a livestock company that is engaged in an embryo transfer operation. In the future we will have available a supply of normal embryos equal to that of the double-muscled embryos. The experiment should now progress much faster. Our goal for the next year is to produce 8 sets of twins in which one member of each set is double-muscled. This will give us a total of 10 such sets and sufficient numbers for confidence in our conclusions.

2. The Effects of Testosterone on the Genetic Development of the Male and Female Reproductive System in Sheep:

Several years ago we observed a very unusual bovine intersex. This animal had been born twin to a normal bull calf. It has a penis projecting from the area normally occupied by the vulva and a testis was located between the hide and abdominal wall in both flanks. The animal exhibited masculine behavior and had excessive crest development indicating testosterone was being produced and utilized by target tissues. Chromosomal analysis of lymphocytes and testicular fibroblasts showed that both twins were genetic chimeras and that the intersex member of the twin set was in fact an unusual freemartin.

To explain the sex reversed freemartin, we theorized that the fetal membranes of the twins had fused earlier than usual in embryonic development. Membrane fusion permitted vascular anastomosis and established the physical basis for blood exchange between the twins.

It has been known for a long time that the unique conditions of placentation in the bovine is responsible for the freemartin syndrome. Early in embryogenesis fusion of the fetal membranes of twin calves establishes a common circulatory system and thus, the physical basis for blood exchange between the two calves. It has been shown that testosterone synthesis occurs in the interstitial cells very early in testicular development.

As soon as a common vascular system is established between twin embryos, testosterone circulates into the female co-twin and interferes with the normal development of her reproductive tract. It is thought that the extent of masculinization of the female reproductive tract is positively correlated with the time at which the common vascular system is established between the twins. The earlier during pregnancy the common vascular system is established, the greater will be the degree of masculinzation of the female because the target tissues will receive testosterone at threshold levels during the time in which the tissues are most sensitive to its actions.

It occured to us that if we could administer testosterone to genetic female embryos before differentiation of the indifferent gonads began along the lines of femaleness, we might bring about complete sex reversal. We were further intrigued with the possibility that such sex reversed females could function as fertile phenotypic males. These sex reversed phenotypic males which would be genetic females, would sire only female offspring.

Accordingly, we designed a series of experiments to test the effectiveness of testosterone in regulating genetic development of the female reproductive tract when administered directly to sheep fetuses in varying amounts and times during the first 50 days of gestation. The exepriment was concluded in 1978 and a summary of the results is presented below.

Laparotomies were performed on pregnant ewes between 10 and 49 days post-breeding to facilitate the direct intrauterine injection of testosterone cypionate. Fifty-two of the 55 lambs were phenotypic males. Of the 55, 21 were normal XY males, 3 were normal XX females, and 31 were virilzed XX females (intersexes). The external genitalia of the intersexes consisted of a normal appearing penis and a small empty scrotum. They differed from normal males in that their teats were longer and thinner and their scrotums had a more narrow attachment to the abdominal surface. Internally the reproductive tract had differentiated along both male and female lines. Present were ovaries, well-developed epoophoron and paraepoophoron, oviducts, bicornuate uterus, anterior vagina, seminal vesicles, prostate and bulbourethral glands. The size of the prostate and bulbourethal glands increased with age and the presence of horns in some of the intersex lamgs suggested that these genetic females were synthesizing testosterone. Also, radioimmunoassay of blood testosterone showed significantly higher levels for intersex animals than for normal control. Testosterone is normally produced by the cells of Leydig.

A variety of channels and cords, some closely resembling primitive medullary cords, were identified in tissues intimately associated with intersex ovaries. This observation suggests that testosterone may function in maintaining the structure of the tubules and channels of the testis while H-Y antigen induces Sertoli cell differentiation of the follicle cells.

These results clearly indicate that it is not possible to completely convert genetic females to functional phenotypic males with testosterone alone. However, during the course of this exepriment researchers at another university discovered a histocompatability antigen which may have the capability of completely reversing sex of genetic females to that of males. This antigen, known as the H-Y antigen is produced under the control of a gene located on the Y chromosome. A fascinating experiment for the future would be to inject H-Y antigen along with testosterone into young mammalian

female embryos to test the effectiveness of these biochemicals in sex control.

3. Genetic Potential of Domestic x Banteng Cattle in Commercial Beef Cattle Production:

A few years ago we became interested in Banteng cattle and their hybrids. The Banteng is a member of the Bos banteng genus and species and is native to Indonesia. These cattle have been domesticated and are found primarily on the island of Bali. In the Western world they are found almost exclusively in Zoos.

Our interest in these cattle and their hybrids came about because of the accidental mating of Banteng bull with several domestic cows on the Camp Cooley ranch near Franklin, Texas. The matings proved fertile, and a nubmer of F_1 hybrids were produced. The F_1 hybrid males were found to be sterile but the F_1 females were completely interfertile with both domestic and Banteng bulls. We have established a herd of approximatley 75 F_1 heifers which are being backcrossed to purebred Angus and Brahman bulls. The first backcross heifers will again be backcrosses to Angus bulls to produce 7/8 domestic, 1/8 Banteng cattle. Based on reports in the literature, the second backcross bulls are expected to be fertile.

The purpsoe of this investigation is to determine if cattle having varying percentages of Banteng inheritance have any advantages for beef cattle production in Texas. A feedlot trial of 8 F_1 Banteng bulls and steers has just been completed. Banteng cattle were compared with 8 domestic steers which were fed the same ration during the same time period as the Banteng cattle.

In general, the F_1 Banteng cattle did not perform well in the Feedlot. They gained 0.4 lb per day less than the controls and required about 10 percent more feed for a pound of gain than the controls. These results were not unexpected. The F_1 Banteng crosses are extremely nervous and their disposition is definitely on the "Wild Side". Also contributing to the poor feedlot performance was the cold,wet weather of the past winter. Banteng cattle do not grow as much winter hair as domestic cattle and appear to suffer much more in cold wet weather than do domestic breeds of cattle. Considering that Banteng cattle are native to a warm humid climate and evolved primarily on a forage diet, the feedlot performance was not entirely unexpected.

The carcasses of the Banteng crosses were entirely acceptable and compared favorably with the control cattle. They had a quality grade of average good and only 0.14 inches of fat as compared with 0.27 inches of fat for the controls. Tenderness and other measures of palatability are presently being evaluated on the carcasses of these animals.

IV. PUBLICATIONS DURING THE YEAR:

Berardino, Dino Di, Frances E. Arrighi and Nat M. Kieffer. 1979. Nucleolus organizer regions in two species of Bovidae. J. Heredity 70:47-50.

Pathak, S. and Nat M. Kieffer. 1979. Sterility in hybrid cattle. I. Distribution of constitutive heterochromatin and nucleolus organizer regions in somatic and meiotic chromosomes. Cytogenet. Cell Genetics 24:42-52.

Stallings, R.L. and Nat M. Kieffer. 1980. Chromosome characterizations in a restricted population of Geomys bursarius (Rodentia: Geomyidae). Cytologia: (In Press).

Berardino, Dino Di, L. Iannuzzi, T.M. Bettini, F.E. Arrighi, N. Kieffer and D. Matassino. 1980. Ag-NORs variation and banding homologies in two species of Bovidae: Bubalus bubalis L. and Bos taurus L.

Stiles, M.L. 1979. Testosterone-induced phenotypic sex reversal in sheep. M.S. Thesis. Texas A & M University, College Station.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		Angus	Brahman	Hereford	Holstein	Jersey
Breed of dam		Angus	Brahman	Hereford	Holstein	Jersey
Line or group[1]		Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	22G1 28G2	18G1 14G2	40G1 50G2	17G1 22G2	4G1 14G2
	Yearling heifers	2G2	2G2	6G2	1G2	
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		Angus	Angus	Angus	Angus	Brahman
Breed of dam		Brahman	Hereford	Holstein	Jersey	Hereford
Line or group[1]		F1-F2	F1-F2	F1-F2	F1-F2	F1-F2
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	25F1 27F2	20F1 20F2	29F1 32F2	18F1 26F2	32F1 25F2
	Yearling heifers	2F2		1F2	1F2	4F2
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		Brahman	Brahman	Hereford	Hereford	Holstein
Breed of dam		Holstein	Jersey	Holstein	Jersey	Jersey
Line or group[1]		F1-F2	F1-F2	F1-F2	F1-F2	F1-F2
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	21F1 11F2	26F1 28F2	30F1 44F2	40F1 53F2	21F1 31F2
	Yearling heifers	1F2	1F2	2F2	1F2	
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
Agriculture Experiment Station
Blacksburg, Virginia

I. PROJECT: State 2022120 (S-10)

Evaluating Sire and Dam Breeds in Crossbreeding Programs for Maximizing Beef Production

II. OBJECTIVES:

To evaluate several cattle breeds as sire breeds when bred to Hereford and/or Angus cows (Phase I)

To compare the productivity of several kinds of crossbred cows with each other and with straightbred cows (Phase II)

To determine the best combination of breeds and mating schemes for maximizing beef production (Phase III)

III. PERSONNEL:

Thomas J. Marlowe and Thomas H. Bibb

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Scope and Nature of Work

This research is being conducted on five farms operated by the Virginia Department of Corrections at Beaumont, Bland, Hanover, State Farm and Southampton. Since details of the project have been reported earlier, they will not be repeated here.

Phase II involved three cycles as follows:

Cycle 1 involved the mating of all heifers, either as yearlings or as two-year-olds, to Angus bulls (except for the straightbred controls) at each of the five locations and evaluation of each of the 13 kinds of females on their own reproductive performance; the growth performance of their progeny to birth, weaning, 12 months and 18 months; and their carcass characteristics at Bland and Southampton.

Cycle 2 involved all subsequent matings through the 1978 calf crop. The approximate number of phase II cows at each location and the breed of bulls used was reported in the 1976 annual report of S-10. Cow performance is being evaluated on fertility, calving ease and calf losses, pounds of calf weaned per cow exposed and/or per 100 pounds of cow exposed, postweaning gains to 12 and 18 months of age, conformation and carcass quality of their progeny at Bland and Southampton. Cows are weighed annually so that calf weights can be related to cow weights and cow winter maintenance cost.

Cycle 3 started with the 1978 breeding season and will include two calf crops. All kinds of cows, except the straightbred controls, were mated equally to Limousin x Shorthorn and Maine-Anjou x Shorthorn bulls. The data will be used to look at possible genetic x environmental interactions.

B. 1978 Research Results

Performance of Phase II cows and their progeny are shown in table 1 for the 1978 calf crop by location and kind of cow. Table 2 shows the same information for all years combined for cycle 1 and table 3 for cycle 2. Cow breeds as designated by letters are Angus (AA), Angus x Hereford (AH), Brown Swiss x Hereford (BH), Charolais (CC), Charolais x Hereford (CH), Charolais x Holstein (CF), Hereford (HH), Holstein x Angus (FA), Holstein x Hereford (FH), Shorthorn x Hereford (SH), Simmental x Hereford (SH) and percentage Simmental (Sm%). Shorthorn bulls were designated as Sh.

Perhaps the most meaningful measure of cow performance is the pounds of calf weaned per cow exposed since this measure combines fertility, calf mortality and growth rate. By this measure, all crossbred (XB) heifers were superior to straightbred (SB) heifers with the exception of the SB Angus at Bland and the SB Herefords at Hanover (see table 2). The superiority of the SB Herefords at Hanover was apparently due to two factors, they were a year older at first breeding and a superior bull was used for two years. Comparing kinds of cows for all subsequent calvings (table 3), the only exception was at State Farm where the Hereford cows producing crossbred calves were equal to the AH, CH and SH cows.

C. 1978 Cattle Inventory

The cattle inventories shown in tables 6-10 are the cows bred in 1977 for the 1978 calf crop and their progeny, except that the yearling cattle are those produced in the 1977 calf crop and performance tested as yearlings.

V. FUTURE PLANS

A. As outlined briefly under IV A above, cycle 3 of phase II started with the 1978 breeding season and runs through two calf crops. One half of each kind of cow at each of four locations, except for the SB controls, were mated to Limousin x Shorthorn bulls and the other half to Maine-Anjou x Shorthorn bulls. Those data will provide for an additional evaluation of the phase II cows when mated to the same kinds of bulls at all locations (mountain, Piedmont and Coastal areas) and also make it possible to look at any genetic x environmental interactions.

Female offspring from the phase II cows have been performance tested and the best straightbreds, single crosses, 3-way crosses and 4-way crosses are being compared as foundation females. These are bred to Angus bulls for their first calves and to bulls of another breed or breeds for subsequent calvings.

A 4-way cross (synthetic) herd of two kinds (SHCA and SHFA) has been established at Southampton. Another 4-way cross herd of three kinds (SACH, SAFH and SASH) has been established at State Farm. These cows are being bred first to Angus bulls and thereafter to 4-way cross bulls.

B. A new project entitled "Maximizing Beef Production Through Genetic Engineering" will be initiated in 1980 at Southampton and State Farm with the following objectives:

1) to determine the feasibility of developing one or more new breeds of beef cattle (based on a multibreed foundation) as an alternative to rotational or other crossbreeding systems to utilize heterosis;
2) to compare the amount of heterosis expressed in single crosses *vs* double crosses (F_1 x F_1) *vs* four-way crosses;
3) to determine the extent of heterotic loss from *inter se* matings of a four-breed synthetic;
4) to examine the efficiency of several pathways in developing a new breed.

Cattle remaining from phase II of state project 202212 will be used as the foundation females for this research.

Southampton. The straightbred Angus (A) cows will be mated to Holstein (F) and Simmental (S) bulls to produce F_1 offspring (FA and SA). The FA females will be bred to F_1 males of Simmental x Hereford breeding (SH) and the SA females to F_1 males of Holstein x Hereford breeding (FH) to produce two kinds for 4-way cross females (SHFA and FHSA) of the same four breeds. Finally, the 4-way cross females will be bred to 4-way cross males of the same four breeds to produce the new "synthetic" breed through *inter se* matings. Females produced from these *inter se* matings will be compared to 4-way cross females resulting from F_1 x F_1 matings as well as to both the single crosses and the F_1 x F_1 crosses.

The expected numbers of cows of each type to be mated are shown in table 4.

Southampton

Season	Single cross	F_1 x F_1	4-Way cross	Synthetic	Total
1979-80	F x A (20 S x A (50	SH x FA (30)	SHFA (30)	Inter se (10)	140
1980-81	F x A (20)	SH x FA (25)	SHFA (30)	Inter se (25)	170
1981-82	F x A (20) S x A (40)	SH x FA (25) FH x SA (40)	SHFA (25) FHSA (10)	Inter se (35)	195
1982-83	F x A (25) S x A (25)	SH x FA (25) FH x SA (40)	SHFA (25) FHSA (30)	Inter se (35)	205
1983-84	F x A (20) S x A (20)	SH x FA (25) FH x SA (40)	SHFA (25) FHSA (40)	Inter se (35)	205
TOTALS	F x A 105 S x A 185 290	SH x FA 130 FH x SA 140 270	SHFA 135 FHSA 80 215	Inter se 140 140	370 545 915

State Farm. The straightbred Hereford (H) cows remaining from phase II will be bred to straightbred bulls of the Angus (A), Holstein (F) and Simmental (S) breeds to produce F_1 offspring (AH, FH and SH). Likewise, the remaining Angus x Hereford (AH), Holstein x Hereford (FH) and Simmental x Hereford (SH) cows will be mated to F_1 bulls of Simmental x Holstein (FS), Simmental x Angus (SA) and Angus x Holstein (AF) breeding, respectively, to produce three kinds of 4-way cross offspring (SFAH, SAFH and AFSH) with the same four breed composition as those at Southampton. Inter se mating will then be made among the 4-breed crosses to produce the new "synthetic" breed.

Offspring produced from the females resulting from inter se matings among the 4-way cross females will be compared to the offspring from 4-way cross females resulting from the $F_1 \times F_1$ matings as well as the offspring from both single cross and $F_1 \times F_1$ matings.

The expected numbers of cows of each mating type are shown in table 5.

State Farm

Season	Single crosses	$F_1 \times F_1$	4-Way cross	Synthetic	Total
	Sire Dam	Sire Dam			
1980	F x H (35) S x H (35) A x H (35)	SA x FH (40) AF x SH (40) SF x AH (40)	SAFH (30)	Inter se (10)	265
1981	F x H (35) S x H (35) A x H (35)	SA x FH (50) AF x SH (50) SF x AH (50)	SAFH (35) AFSH (15) SFAH (15)	Inter se (25)	345
1982	F x H (35) S x H (35) A x H (35)	SA x FH (35) AF x SH (35) SF x AH (35)	SAFH (35) AFSH (35) SFAH (35)	Inter se (50)	365
1983	F x H (35) S x H (35) A x H (35)	SA x FH (35) AF x SH (35) SF x AH (35)	SAFH (35) AFSH (40) SFAH (40)	Inter se (100)	425
1984	F x H (35) S x H (35) A x H (35)	SA x FH (35) AF x SH (35) SF x AH (35)	SAFH (35) AFSH (50) SFAH (50)	Inter se (150)	495
TOTALS	F x H 175 S x H 175 A x H 175 525	SA x FH 195 AF x SH 195 SF x AH 195 585	SAFH 170 AFSH 140 SFAH 140 450	Inter se 335	1895

C. Another new project entitled "A Comparison of Crossbred Cow Types for Feeder Calf Production" has just been initiated with the objective "to compare the productivity and calf performance to weaning of Angus x Hereford cows to that of several crossbred types with or without an increase in milk production level". The following crossbred heifers have been obtained through an exchange of cattle with the Virginia Department of Corrections:

16 LS x AH	16 MS x AH	30 A x H
16 LS x CH	16 MS x CH	Controls
16 LS x FH	16 MS x FH	

where L = Limousin, M = Maine-Anjou, S = Shorthorn, A = Angus, H = Hereford, C = Charolais and F = Holstein (Friesian).

This will allow comparison of the most common and available crossbred cow type in Virginia (Angus x Hereford) with the several large crossbred types varying in milk production. Level of milk production of the LS x AH, MS x AH, LS x CH and MS x CH crosses is not expected to be greatly different from that of the smaller A x H cross. However, the LS x FH and MS x FH crosses will combine an increase in size with an increase in milk production.

All 126 females will be bred to Polled Hereford bulls as yearlings in the spring of 1980 and thereafter to Simmental bulls for five calf crops.

Participating in this project will be T. J. Marlowe, D. R. Notter, T. N. Meacham and J. S. Copenhaver.

VI. PUBLICATIONS DURING THE YEAR:

Marlowe, T. J. 1978. Rationale and need for data adjustment. Proc., BIF Res. Symposium and Annual Meeting.

Marlowe, T. J. 1978. Preweaning, Conditioning and Stocker Management. The Feedlot. (2nd Ed.). Lea & Febiger, Philadelphia.

Marlowe, T. J. 1978. Weaning, preconditioning and selling calves. Ch. 13. Commercial Beef Cattle Production. (2nd Ed.). Lea & Febiger.

Marlowe, T. J. and D. E. Brower, Jr. 1978. Relationship of the commercial cow-calf producer to the purebred breeder. Ch. 17. Commercial Beef Cattle Production. (2nd Ed.). Lea & Febiger, Philadelphia.

Marlowe, T. J. and W. H. Whittle, Jr. 1978. Adjustment factor comparisons for crossbred and straightbred cows. 1977-78 Livestock Research Report, VPI&SU Res. Div. Rpt. 174, pp 70-75.

Marlowe, T. J. and W. H. Whittle, Jr. 1978. Comparisons of age of dam and sex adjustment factors for straightbred and crossbred cows. J. Anim. Sci. 47. Supplement 1 (Abstract).

Marlowe, T. J. and W. E. Wyatt. 1978. A comparison of bull and steer carcass characteristics. 1977-78 Livestock Research Report, VPI&SU Res. Div. Rpt. 174, pp 35-37.

TABLE 1. VIRGINIA DEPARTMENT OF CORRECTIONS - 1978
PHASE II COW AND CALF PERFORMANCE BY LOCATION AND KIND OF COW

Sire breed	Cow breed	Number of cows exp	open	died	Calf losses	Calves weaned No.	%	205d wt	grade	cond	Lb cal cow ex
						Beaumont					
SmA	CH	27	7	0	3	17	63.0	572	13.7	8.5	360
SmA	FH	27	3	0	2	22	81.5	576	13.8	8.6	469
SmA	ShH	29	1	0	2	27	93.1	512	13.0	8.0	477
SmA	HH	26	6	0	4	16	61.5	460	12.9	8.1	283
Her	HH	33	5	1	3	25	75.7	395	12.0	8.3	299
Combined		142	22	1	14	107	75.3	500	13.0	8.3	376
						Bland					
Ang	AA	34	8	1	2	23	67.6	430	11.6	7.5	291
Ang	CH	42	14	2	2	24	57.1	506	13.4	7.8	289
Ang	CF	12	4	0	0	7	58.3	539	13.1	8.6	314
Ang	SH	42	13	0	5	24	57.1	475	13.0	7.2	271
Ang	HH	34	11	1	3	20	58.8	399	12.5	6.9	235
Her	HH	35	12	1	5	17	48.6	389	11.9	6.5	189
Sim	S%	49	13	0	7	30	61.2	484	13.1	6.8	296
Combined		248	75	5	24	145	58.5	460	12.7	7.3	270
						Hanover					
A,SmH	AH	34	6	0	1	27	79.4	412	10.9	5.9	327
A,SmH	BSH	38	5	2	0	33	86.8	346	11.0	5.8	300
A,SmH	CH	26	3	0	2	20	76.9	380	12.3	6.1	292
A,SmH	HH	28	5	0	4	19	67.8	323	11.4	5.7	219
Her	HH	23	5	2	2	15	65.2	322	11.8	5.9	210
Combined		149	24	4	9	114	76.5	362	11.8	6.2	27
						Southampton					
Ang	AA	28	1	0	0	27	96.4	383	12.5	6.9	36
Char	CC	20	3	0	0	17	85.0	450	13.6	6.9	38
SmH	CA	29	0	0	0	29	100.0	385	13.2	6.8	38
SmH	FA	31	1	0	3	27	87.1	456	13.3	7.2	39
SmH	AA	26	1	1	2	23	88.5	387	13.0	7.1	34
A,4W	4W	30	1	0	0	29	86.7	474	13.4	7.4	41
Combined		164	7	1	2	152	92.7	424	13.2	7.1	39
						State Farm					
Sh	AH	52	7	0	5	41	78.8	488	13.0	9.0	38
A,Sh	BSH	44	6	0	2	37	84.1	520	12.7	8.0	44
A,Sh	CH	50	8	0	4	39	78.0	501	13.3	7.9	39
A,Sh	FH	55	6	0	4	45	81.8	515	12.9	8.3	42
A,Sh	SH	50	8	0	5	38	76.0	478	12.8	8.0	41
Ang	ShH	44	4	0	2	38	86.4	481	13.1	8.2	36
A,Sh	HH	60	8	0	3	50	83.3	449	12.9	8.0	37
Her	HH	54	5	0	4	44	81.5	406	11.9	8.1	33
4W	4W	22	1	1	3	18	81.8	474	12.3	6.7	38
Combined		431	53	1	32	350	81.2	478	12.8	8.1	38
						All Locations					
All breeds		1134	181	12	81	868	76.5	453	12.7	7.6	34

TABLE 2. VIRGINIA DEPARTMENT OF CORRECTION HERDS
PHASE II CYCLE 1 PERFORMANCE OF HEIFERS CALVING AT EITHER TWO OR THREE YEARS OF AGE, BY BREED AND LOCATION

Heifer breed	No. years	Number of heifers exp	open	died	Calf loss	Calf survival and performance to wean No.	%	ADG	W.wt	Gr	Cond	Lb ca wn /cow exp
					Beaumont							
CH	2	27	4	0	5	18	66.7	1.47	430	12.8	7.8	287
FH	2	25	3	0	1	21	84.0	1.62	471	13.0	8.1	395
SH	2	24	4	0	1	19	79.2	1.38	410	13.0	7.8	325
HH	2	23	3	0	4	16	69.6	1.18	363	11.2	7.4	244
HH	2	27	4	0	2	21	77.8	1.07	331	10.7	7.0	257
Combined	2	126	18	0	14	95	75.4	1.35	402	12.2	7.6	303
					Bland							
AA	7	46	3	1	5	37	80.4	1.62	427	11.7	6.9	343
CH	7	67	15	0	5	47	70.1	1.60	442	12.5	6.9	310
CF	5	22	1	0	1	20	90.5	1.79	489	12.3	7.2	443
SH	7	73	13	2	9	51	69.9	1.59	444	12.7	7.0	310
HH	7	78	7	1	27	44	56.4	1.35	379	11.4	6.5	214
HH	7	70	8	1	20	42	60.0	1.17	338	10.8	6.6	203
Sm%	7	47	6	0	6	35	74.5	1.70	476	13.6	7.1	355
Combined	7	403	53	5	73	276	68.5	1.53	422	12.1	7.0	289
					Hanover							
AH	6	42	4	0	8	30	71.4	1.16	342	10.7	6.2	244
BH	6	54	10	0	10	34	63.0	1.32	388	11.5	6.1	244
CH	6	50	11	0	10	29	58.0	1.27	386	12.1	6.5	224
HH	6	52	4	0	5	44	84.6	1.16	348	11.1	6.1	294
HH	4	24	2	0	3	19	79.2	1.36	398	11.9	6.6	315
Combined	6	222	31	0	36	156	70.3	1.25	371	11.4	6.3	261
					Southampton							
AA	5	63	11	1	6	46	73.0	1.48	372	11.0	7.4	271
CC	5	39	11	1	5	23	59.0	1.90	481	12.5	7.1	284
CA	5	44	9	1	3	31	70.4	1.58	410	12.0	7.2	289
FA	5	42	3	0	2	37	88.1	1.75	443	11.9	7.5	390
Combined	5	188	35	3	16	137	72.9	1.64	417	11.8	7.4	304
					State Farm							
AH	4	59	6	1	6	47	79.7	1.42	403	11.9	7.2	321
BH	4	46	3	0	5	39	84.8	1.60	451	11.6	6.6	382
CH	4	54	6	0	7	41	75.9	1.50	429	12.7	7.1	326
FH	4	60	2	0	5	53	89.3	1.67	468	13.0	7.1	418
SH	4	43	3	0	1	39	90.7	1.47	418	12.1	7.0	379
SH	4	51	5	0	5	41	80.4	1.48	422	12.6	7.0	339
HH	4	55	4	1	8	42	76.4	1.31	378	11.9	6.6	289
HH	4	59	9	1	9	39	66.1	1.31	380	11.7	7.2	251
Combined	4	427	38	3	46	341	79.8	1.44	411	12.2	6.8	328

TABLE 3. VIRGINIA DEPARTMENT OF CORRECTIONS HERDS PHASE II, CYCLE 2 PERFORMANCE OF COWS AFTER FIRST CALVING BY BREED AND LOCATION

Sire breed	Cow breed	No. years	Number of cows exp	open	died	Calf loss	Calf survival and performance to weaning No.	%	ADG	W.wt	Gr	Cond	lb ca wn cow ex
						Beaumont							
SmA	CH	4	103	20	2	10	73	70.9	1.74	466	13.2	7.4	330
SmA	FH	4	101	18	0	5	78	77.2	1.84	491	13.2	7.3	379
SmA	$\bar{S}$H	4	108	9	0	9	91	84.2	1.63	446	12.8	7.2	375
SmA	HH	4	100	26	3	11	62	62.0	1.38	376	12.0	6.6	229
HH	HH	4	129	17	2	15	96	74.4	1.37	374	12.2	7.2	278
Combined		4	541	90	7	50	400	73.9	1.59	430	12.7	7.2	318
						Bland							
AA	AA	6	65	9	1	5	50	76.9	1.68	430	12.0	7.4	331
AA	CH	6	154	31	7	9	111	72.1	1.88	493	13.2	7.4	356
AA	CF	6	75	14	3	3	53	70.7	2.03	523	13.1	7.2	370
AA	SH	6	156	24	1	19	116	74.4	1.84	478	13.3	7.4	356
AA	HH	6	111	29	1	9	73	64.6	1.61	424	13.0	7.0	274
HH	HH	6	120	28	4	11	78	65.0	1.40	381	11.8	7.0	248
Sm	Sm%	6	70	11	1	13	48	68.6	1.81	479	14.0	7.0	329
Combined		6	751	146	18	69	529	70.4	1.71	448	12.8	7.1	315
						Hanover							
SmH	AH	5	96	17	2	3	79	79.2	1.37	387	12.3	6.5	306
SmH	BH	4	79	19	2	5	54	68.3	1.40	404	12.4	6.2	276
SmH	CH	5	81	15	2	10	55	67.9	1.33	385	12.3	6.3	261
SmH	HH	5	79	25	0	8	46	58.2	1.14	339	11.5	5.7	197
HH	HH	5	76	14	2	8	52	68.4	1.36	381	12.0	6.6	261
Combined		5	411	90	8	34	283	68.8	1.37	391	12.3	6.3	269
						Southampton							
AA	AA	6	117	15	0	3	99	84.6	1.66	412	12.3	7.7	348
CC	CC	6	92	19	2	3	69	75.0	2.12	521	13.2	7.3	391
SmH	AA	6	126	7	3	16	103	82.4	1.80	444	12.4	7.8	366
SmH	CA	6	125	10	0	3	112	89.6	1,91	479	13.0	7.4	429
SmH	FA	6	136	6	0	14	116	92.1	2.07	514	13.2	7.7	473
Combined		6	596	56	5	39	499	83.7	1.86	461	12.9	7.4	386
						State Farm							
Sh	AH	3	92	14	2	9	69	75.0	1.68	436	12.6	7.7	327
Sh	BH	3	59	14	0	2	43	72.9	1.77	467	12.9	7.1	340
Sh	CH	3	89	18	0	8	63	70.8	1.76	464	13.4	7.4	328
Sh	FH	3	92	12	0	6	74	80.4	1.83	479	13.1	7.5	385
AA	$\bar{S}$H	3	66	13	0	4	49	74.2	1.66	459	12.6	7.2	340
Sh	SH	3	85	16	0	7	63	74.1	1.74	446	13.2	7.4	330
Sh	HH	3	107	11	0	9	87	81.3	1.55	411	12.5	7.2	334
HH	HH	3	74	9	0	9	56	75.7	1.37	364	11.5	6.9	275
Combined		3	664	107	2	54	504	75.9	1.72	449	12.8	7.6	341

Production, Inventory and Performance Data, S-10 Herds - 1979

State Virginia

TABLE 6.

Location		Beaumont School for Boys, Beaumont, Virginia					
Breed of sire		Sim x Ang	Sim x Ang	Sim x Ang	Sim x Ang	Hereford	All breeds
Breed of dam		Char x Her	Hol x Her	Sh x Her	Hereford	Hereford	All breeds
Line or group[1]		4-Way X	4-Way X	4-Way X	3-Way X	Straightbred	All lines
Percent used in project		100	100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	27	27	29	26	33	142
	Yearling heifers	8	15	12	7	14	56
	Bulls and steers under 1 year	8	7	15	9	10	49
	Heifers under 1 year	8	15	12	7	15	57
	Bulls over 1 year	3 Lim x Sh, 3 M-A x Sh, 1 Ang, 1 Her					8
	Steers over 1 year	8	7	15	8	10	48
Repro. perf.	Percent pregnant[2]	74.1	88.9	96.5	76.9	84.8	84.5
	Calf survival percent[3]	85.0	91.7	93.1	80.0	89.3	88.4
Wean. perf.	Adj. ADG[4]	2.07	2.06	1.46	1.61	1.46	1.70
	Ave. type sc.[5]	13.7	13.8	13.0	12.9	12.2	13.0
Postweaning performance	No. of bulls	0	0	0	0	0	0
	No. of heifers	8	15	12	7	14	56
	No. of steers	8	7	15	8	10	48
Slaughtered	No. of bulls						
	No. of heifers						
	No. of steers						
Remarks	Lbs calf/cow exp	360	469	477	283	299	376

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Virginia

TABLE 7.

Location		Bland Correctional Center, Bland, Virginia							
Breed of sire		Ang	Ang	Ang	Ang	Ang	Her	Simmental	All breeds
Breed of dam		AA	CxH	CxF	SxH	HH	HH	% Sim	All breeds
Line or group[1]		SB	3WX	3WX	3WX	2WX	SB	Breeding up	All lines
Percent used in project		100	100	100	100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	34	42	12	42	34	35	49	248
	Yearling heifers	9	12	3	18	9	11	5	67
	Bulls and steers under 1 year	11	8	3	12	8	12	14	68
	Heifers under 1 year	8	15	4	7	11	5	13	63
	Bulls over 1 year	3 Lm	x Sh,	3 M-A	x Sh,	3 Ang,	2 Her,	2 Sim	13
	Steers over 1 year	12	18	5	16	12	9	3	75
Repro. perf.	Percent pregnant[2]	76.5	66.7	75.0	69.0	67.6	65.7	73.5	69.7
	Calf survival percent[3]	92.0	91.7	100.0	82.7	86.9	77.3	81.1	85.8
Wean. perf.	Adj. ADG[4]	1.69	2.00	2.17	1.84	1.55	1.44	1.79	1.76
	Ave. type sc.[5]	11.6	13.4	13.1	13.0	12.5	11.9	13.1	13.0
Postweaning performance	No. of bulls	0	0	0	0	0	0	0	0
	No. of heifers	9	12	3	18	9	11	5	67
	No. of steers	12	18	5	16	12	9	3	75
Slaughtered	No. of bulls	0	0	0	0	0	0	0	0
	No. of heifers								
	No. of steers	5	14	11	14	8	11	4	67
Lbs calf/cow exp		291	294	314	275	234	195	316	270
Remarks									

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Virginia

TABLE 8.

Location		Hanover Correctional Unit, Hanover, Virginia					
Breed of sire		A, Sm x H	A, Sm x H	A, Sm x H	A, Sm x H	Hereford	All breeds
Breed of dam		A x H	BS x H	C x H	Hereford	Hereford	All breeds
Line or group[1]		3 & 4W X	3 & 4W X	3 & 4W X	2 & 3W X	SB	All lines
Percent used in project		100	100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	32	41	26	28	23	150
	Yearling heifers	5	14	8	7	6	40
	Bulls and steers under 1 year	6	10	7	5	5	33
	Heifers under 1 year	12	15	12	11	10	60
	Bulls over 1 year	3 Lm x Sh, 3 M-A x Sh, 1 Ang, 1 Her					8
	Steers over 1 year	17	5	9	9	9	49
Repro. perf.	Percent pregnant[2]	84.4	85.4	88.5	82.1	78.3	83.9
	Calf survival percent[3]	100.0	97.0	86.9	82.6	93.7	92.7
Wean. perf.	Adj. ADG[4]	1.25	1.15	1.27	1.12	1.27	1.20
	Ave. type sc.[5]	10.9	11.0	12.3	11.4	11.8	11.8
Postweaning performance	No. of bulls	0	0	0	0	0	0
	No. of heifers	5	14	8	7	6	40
	No. of steers	17	5	9	9	9	49
Slaughtered	No. of bulls						
	No. of heifers						
	No. of steers						
Remarks	Lbs calv/cow exp	295	279	294	224	275	277

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Virginia

TABLE 9.

Location		Southampton Correctional Center, Capron, Virginia					
Breed of sire		Angus	Charolais	A, Sm x H	A, Sm x H	A, Sm x Her	All bree
Breed of dam		Angus	Charolais	Char x Ang	Hol x Ang	Angus	All bree
Line or group[1]		SB	SB	4 Way X	4 Way X	3 Way X	All bree
Percent used in project		100	100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	28	20	29	31	26	134
	Yearling heifers	12	11	13	14	10	60
	Bulls and steers under 1 year	13	11	12	9	13	58
	Heifers under 1 year	14	11	17	13	10	6
	Bulls over 1 year	2 Ang, 2	C x H, 2 Four-Way X				
	Steers over 1 year	13	11	13	14	14	6
Repro. perf.	Percent pregnant[2]	96.4	85.0	100.0	96.8	96.1	95
	Calf survival percent[3]	100.0	100.0	100.0	90.0	92.0	98
Wean. perf.	Adj. ADG[4]	1.55	1.85	1.46	1.81	1.49	1.
	Ave. type sc.[5]	12.5	13.6	13.2	13.3	13.0	13
Postweaning performance	No. of bulls	0	0	0	0	0	
	No. of heifers	12	11	13	14	10	6
	No. of steers	14	11	13	14	14	6
Slaughtered	No. of bulls						
	No. of heifers						
	No. of steers						
	Lbs calf/cow exp	369	382	385	397	307	3

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State Virginia

TABLE 10.

Location		James River-Powhatan Correctional Center, State Farm, Virginia								
Breed of sire		Sh	A,Sh	A,Sh	A,Sh	Ang	A,Sh	A,Sh	Her	All breeds
Breed of dam		AH	BSH	CH	FH	ShH	SmH	HH	HH	All breeds
Line or group[1]		3WX	3WX	3WX	3WX	3WX	3WX	2WX	SB	All lines
Percent used in project		100	100	100	100	100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	52	44	50	55	44	50	60	53	408
	Yearling heifers	11	13	13	20	8	11	18	11	100
	Bulls and steers under 1 year	24	16	19	20	14	12	23	14	
	Heifers under 1 year	16	9	15	15	15	18	21	19	
	Bulls over 1 year	12	Shorthorn, 2 Ang, 2 Her							16
	Steers over 1 year	18	5	16	19	10	14	12	10	104
Repro. perf.	Percent pregnant[2]	86.5	88.6	84.0	89.1	90.9	86.0	88.3	88.7	88.0
	Calf survival percent[3]	89.1	94.9	92.8	91.8	95.0	88.4	94.3	89.4	91.9
Wean. perf.	Adj. ADG[4]	18.4	1.96	1.88	1.94	1.71	1.86	1.72	1.52	1.81
	Ave. type sc.[5]	13.0	12.7	13.3	12.9	12.8	13.1	12.9	11.9	12.8
Postweaning performance	No. of bulls	0	0	0	0	0	0	0	0	-
	No. of heifers	11	13	13	20	8	11	18	11	100
	No. of steers	18	5	16	19	10	14	12	10	104
Slaughtered	No. of bulls									
	No. of heifers									
	No. of steers									
Remarks	Lbs calf/cow exp	385	445	391	423	417	362	375		387

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

COLLEGE OF THE VIRGIN ISLANDS
Agricultural Experiment Station
St. Croix, U.S. Virgin Islands

I. PROJECT: VI00018 (S-10)

General title: Breeding Methods for beef cattle in the Southern Region.
Specific title: Breeding Methods for beef cattle in the U.S. Virgin Islands.

II. OBJECTIVES:

A. To estimate genetic parameters associated with rate of growth and maturity and other characteristics of biological and economical importance.

1. To compile and elucidate all information that exists on the Senepol breed.

2. To characterize the Senepol breed by performance testing under Virgin Islands conditions and in other environments in the Southern Region.

3. To determine the breeding value of the Senepol cattle for growth performance and maternal traits.

B. To establish general combining ability of breeds, specific combining ability in breed crosses and heterosis of various types of crosses.

1. To determine the breeding value of the purebred and crossbred Senepol for growth performance and maternal traits.

III. PERSONNEL:

H. Hupp and W. Janes

IV. ACCOMPLISHMENTS DURING THE YEAR:

All experimental animal units are derived from cooperating Senepol breeders. All animals are permanently identified by either tattoo or brand and are placed in an on-the-farm performance test program. A limited number of birth weights were taken (58-85 lbs). At weaning, cows and calves are weighed and graded. Calves are reweighed and graded at 12 and 18 months of age. Slaughter data was taken on all animals in the program that were slaughtered between 12 and 18 months of age through September and then carcass data was taken on a random sample.

During the second year of this program, 5 of the 8 Senepol breeders began taking birth dates and identifying cow/calf pairs. Detailed herd inventories were compiled and attempts were made to computerize this information on a local computer.

Two additional experiments were initiated to help characterize the Senepol under Virgin Islands conditions. A milk production trial on natural pasture involving 44 cows at two locations was initiated in September. A random sample of cows calving from September to November were selected, blocking on sire of the cow and cow age. Monthly milk samples were monitored by the weigh-suckle-weigh technique through 8 months of lactation. Milk samples will be taken at 1, 3, 5 and 7 months of lactation for lab analyses of fat and total solids.

A 3^2 factorial feeding experiment was initiated at 3 locations involving 90 bulls between 8 and 10 months of age. The first set of treatments are A. Pasture; B. Pasture and 1% body weight of 14% beef finisher; C. 2% body weight of 14% beef finisher and hay or green chop. The second set of treatments was 112, 140 and 168 days on test. Meat samples will be taken on 54 bulls for taste panel work.

V. FUTURE PLANS:

Present research work will continue to accomplish all listed objectives. The on-the-farm performance test will be continued. Additional breeders will be encouraged to participate. Both the milk production and feeding experiments will be replicated.

VI. PUBLICATIONS DURING THE YEAR:

Routine Annual Reports

Production, Inventory and Performance Data, S-10 Herds - 1979

State U.S. Virgin Islands

Cooperating Breeders		Annaly Farm Lawaetz	Castle Nugent Gasperi		Granard Nelthropp	Fritz E. Lawaetz
Breed of sire		Senepol	Senepol	Senepol	Senepol	Senepol
Breed of dam		Senepol	Charolais	Senepol	Senepol	Senepol
Line or group[1]		Purebreds	Senepol - Charolais x	Purebreds	Purebreds	Purebreds
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	708	40	245	253	66
	Yearling heifers	150	8	67	75	15
	Bulls and steers under 1 year	210	9	74	55	28
	Heifers under 1 year	240	14	74	45	27
	Bulls over 1 year	100	14	15	60	5
	Steers over 1 year	-0-	-0-	-0-	-0-	-0-
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks TOTAL:		1,408	83	475	488	141

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: Sex, Age of Dam

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State U.S. Virgin Islands

Cooperating Breeders		Annaly Farms Lawaetz	Castle Nugent Casperi		Halver Moolenaar	Granard Est. Nelthropp
Breed of sire		Senepol	Senepol	Senepol	Senepol	Senepol
Breed of dam		Senepol	Charolais	Senepol	Senepol	Senepol
Line or group[1]		Purebreds	Senepol-Charolzis x	Purebreds	Purebreds	Purebreds
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1979	Cows 2 years and over	589	30	220	17	
	Yearling heifers	195	6	29	7	11
	Bulls and steers under 1 year	145	7	47	4	55
	Heifers under 1 year	143	4	62	5	44
	Bulls over 1 year	56	13	13	2	20
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks TOTAL:		1,128	60	371	35	405

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: Sex, Age of Dam

[5]Suggest S-10 scoring system; indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1979

State U.S. Virgin Islands

Cooperating Breeders		Oscar E. Henry	Diamond Crp.	Joe Hodge	Albert McAuliff	
Breed of sire		Senepol	Senepol	Senepol	Senepol	
Breed of dam		Senepol	Senepol	Senepol	Senepol	
Line or group[1]		Purebreds	Purebreds	Purebreds	Purebreds	
Percent used in project		100	100	50	50	
Inventory as of December 31, 1979	Cows 2 years and over	12	133	8	4	
	Yearling heifers	3	3	2	2	
	Bulls and steers under 1 year	2	12	3	1	
	Heifers under 1 year	3	16	4	1	
	Bulls over 1 year	0	42	1	0	
	Steers over 1 year	4	0	0	0	
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks	TOTAL:	24	206	18	8	

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

Sex, Age of Dam

[5]Suggest S-10 scoring system; indicate if different.

S-10-1 (Rev.)

Funds Expended on Beef Cattle Breeding Work in S-10 Herds
During the Year Ending December 31, 1979

State U.S. Virgin Islands

Source	Amount Spent for Permanent Non-recurring Items	Amount Spent for Operating Expenses
Regional Research Funds	$38,104	
USDA funds from ARS		
State-controlled funds[1]		

[1]Include all federal-grant funds, state appropriations, and receipts, if your station spends receipts, in addition to appropriated funds.

Income from the sale of cattle during the year 19 (include total sales, whether spent on the project or not).

Regional Research Fund Allotment for year 19 79

$38,104